THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

THE October Meeting of the Institute will be held in Philadelphia, beginning Tuesday evening, October 24th, in the hall of the Franklin Institute, Seventh Street, below Market. The Council has decided to have no excursions during this meeting, that the members in attendance may have the opportunity to visit the International Exhibition. Members are earnestly requested to give early notice to the Secretary of the titles of papers to be read. Blank proposals for membership of the Institute can be obtained from the Secretary.

Authors of papers read before the Institute are entitled to twelve copies of the ENGINEERING AND MINING JOURNAL containing their papers. These copies will be sent on application to the Office of the JOURNAL, or the Secretary of the Institute, immediately after the appearance of the papers. Back numbers cannot always be supplied.

EASTON, Pa., Oct. 2, 1876. THOMAS M. DROWN, Secretary.

MR. SWANK ON SCIENCE IN THE IRON TRADE.

WE publish elsewhere an extract from the *Bulletin of the Iron and Steel Association*, which constitutes its main reply to our criticisms of Mr. SWANK's report. It requires little comment. The facts about the speech of Mr. WHARTON, published in the *Bulletin* and criticized in our columns long ago, are either familiar to our readers, or forgotten. In either case, we shall waste no time in restating them.

We have no suspicion that the rigmarole of the *Bulletin* about the motive of Mr. WHARTON's speech at Philadelphia was authorized by him. That "he spoke for other ears than Mr. BELL's," in order to "correct Mr. BELL's impressions and Mr. RAYMOND's statements," is a proposition which took form, no doubt, in the unaided editorial brain of the *Bulletin*. As for the fact alleged, it is an absolute chimera. We challenge the *Bulletin* to show that Mr. RAYMOND ever in his life made any representations whatever to Mr. BELL "concerning the views of the ironmasters of this country on the question of Free Trade." Mr. WHARTON had no such notion in his mind when he made his speech. He will not claim the contrary; and if the *Bulletin* means to imitate in this case the behavior of those people who are morally responsible, and really sincere, it will either retract this foolish and false story, or attempt to prove it. We confess that we have little hope of either phenomenon, though the latter seems not impossible, to a journal which can complacently bring forward as a justification of its gush of Billingsgate upon Mr. RAYMOND, the extract from his speech at Liège. Every sentiment in that extract is open, frank, true, and consistent with Mr. RAYMOND's utterances on all occasions before and since. What he said of science as the fundamental question in industry at home, he said abroad. The ENGINEERING AND MINING JOURNAL repeats it, and will continue to do so, with the hearty approval of every intelligent ironmaster. To our view the "insult to the iron and steel manufacturers of this country" lies in attributing to them a spirit that holds all reference to science in iron making as a "blistering insult." The charge of "cringing sycophancy" and "blistering insult," backed by such a citation only, is enough to make even the management of the Iron and Steel Association put on its spectacles, and anxiously inquire as to the sanity of its Secretary.

Mr. SWANK is very indignant because we said certain parts of his report were suspiciously like Mr. WHARTON's speeches. They were so. Also, because we called his report SWANK's edition of WHARTON. It is so, in the respects which we pointed out. Now, we say that the tone of the *Bulletin* is suspiciously like the *Eatanswill Gazette* and *Independent;* and that its onslaught on the British Empire may fairly be described as SWANK's edition of JEFFERSON BRICK. While we contemplate its noble rage, we can only say with Colonel DIVER, "keep cool, JEFFERSON; don't bust, O you Europeans!"

The *Bulletin* is afraid to attempt the defense of the absurdities in Mr. SWANK's report. It works itself into a fury about Mr. RAYMOND's iniquities, in order to make out of its own passion an excuse for running away. The trick is too thin, as the *Bulletin* will find, to deceive even its own proprietors. Those who pay for the luxury of an organ want music; and Mr. SWANK must turn the crank, or give up the mellifluous job. The Secretary of the Iron and Steel Association should either defend his reports, or stop making reports which cannot be defended. Our criticisms and queries remain. The *Bulletin* dares not answer them—a pitiable confession, not to be hidden by bluster. *

NEW PUBLICATIONS.

THE COMPLETE PRACTICAL MACHINIST; EMBRACING LATHE WORK, VISE WORK, DRILLS AND DRILLING, TAPS AND DIES, HARDENING AND TEMPERING, THE MAKING AND USING OF TOOLS, ETC., ETC. By JOSHUA ROSE, Philadelphia: HENRY CAREY BAIRD & Co., 1876. 12mo., pp. 376. $2.50.

EITHER Mr. ROSE's reading has been quite limited, or his memory is very defective, if he really believes, as he intimates in the preface to this work, that he enters the field as a pioneer, in giving practical instructions to practical men. There is, however, plenty of room for such a treatise as he has written—and we are glad to say, after a very thorough examination, that it is a useful, and, in general, reliable work. Mr. ROSE is not only a workman of no mean ability, but he also has the faculty of imparting his knowledge to others, his style being remarkably clear and interesting. The subject-matter of the book originally appeared as a series of communications to the *Scientific American*, which were afterward partially collected in a work having the title of "Wrinkles and Recipes." Many portions were discussed by intelligent mechanics in the *Scientific American*, at the time of their first publication, so that the author has been afforded a good opportunity to make such corrections as seemed advisable.

While the work is far from being a complete guide to the machinist's trade, it does contain instructions which cover the ordinary routine of the business, including the form of machine tools for the ordinary operations, the manner of forging, hardening, and tempering them, how to use them to the best advantage, and how to fit up engine work. The illustrations of the principal lathe tools, which originally appeared in "Wrinkles and Recipes," are unique, being so carefully drawn and shaded that even a novice could obtain almost as clear an idea of the forms of the tools and the manner of grinding them, as if he inspected models. The tools that are thus delineated are among the best of their kind, the examples being taken, apparently, from the Morgan Iron Works, in this city, a shop in which tools are made to cut at a maximum rate. It would have been difficult to designate a better place in which to make the selection.

The rules for the change wheels on screw-cutting lathes, both single and double geared, are put in such a simple form, and so clearly illustrated by examples, that few mechanics can fail to understand them. Simple as this matter is, it is usually treated in such a manner as to befog the casual reader, and Mr. ROSE is entitled to great credit for his clear and concise rules.

In reading the directions for finishing and fitting up work, it is easy to believe that it is a thorough workman who is talking, one who knows both the *how* and the *why* of accurate manipulation—and this is what gives the book its greatest value—because it teaches the mechanic to seek the reason for each operation, and the principles upon which it depends. It teaches him, for instance, that in finishing up a casting, a removal of the original skin causes a change of form, and then shows why one part should be finished before the other, for the sake of final accuracy. Discussions of this kind will be new to many mechanics, but it is necessary that such matters should be understood by any one who expects to produce really accurate work.

Enough has perhaps been said to give the reader a fair idea of the scope and character of this work, and to show him that it will be quite useful for reference. There are a few points where some changes might have been introduced to advantage, and these will be briefly mentioned.

On p. 35, the "feed" of a machine tool is defined as the thickness of the shavings, but in tables of "speed" and "feed," subsequently given, "feed" is evidently used in a very different sense, and, though it is not so stated, it probably means the number of revolutions required to move the tool one inch along the work. As it stands at present, however, the tables may create some confusion.

On p. 117, are some rules relating to belting, which have long done service among a class of engineers who call themselves "practical," which rules, however, are untrue, both in theory and practice, and therefore are discarded by engineers who are really practical. The rules referred to make the power transmitted by the belt depend upon the area of contact of the belt with the smaller pulley, while it is well known that, within ordinary limits, the amount of power transmitted depends upon the *arc*, rather than the *area* of contact.

On p. 277, is a table for estimating the weight of a casting from the weight of the pattern, which might be more useful for approximation were it more consistent with itself. The reader who discovers, for instance, that castings of iron and zinc weigh, either of them, eight times as much as a mahogany pattern, will find it difficult to understand how an iron casting weighs fourteen times, and a zinc casting fourteen and a half times as much as the white pine pattern.

Another table, on the same page, gives the speeds for emery wheels of different diameters, based on circumferential velocities varying from 2,930 to 3,456 feet per minute, these velocities varying apparently by no fixed rule. For instance, according to the table, a wheel 2 inches in diameter, is to be run at a circumferential velocity of 2,930 feet a minute, an 8-inch at 3,140, 18-inch at 3,300, 20-inch at 3,140, and so on. Experience shows that good emery wheels can be run with safety, and to advantage, at greater speed than the highest allowed by this table, and it seems unfortunate that the speeds were not calculated for a fixed circumferential velocity, as is usual, so that the table would be

available for greater or less velocities by a simple change. It is in the matter of work with emery wheels, however, that the book is especially open to criticism, as the writer does not seem to realize that the place of files, for finishing, is being usurped by grinding machines.

If the latter chapters of this book, relating to the slide valve and pumps, had been omitted, the work would have been improved. There seems to be no excuse for discussing the effect of the angularity of the connecting-rod by a single example, at tedious length (which, indeed, only illustrates it, and does not establish any general principles), in view of the clear and concise discussions of this subject by such writers as ZEUNER and AUCHINCLOSS. The same criticism applies to the method given by Mr. ROSE for setting a slide valve. There seems to be an idea in certain quarters that these matters have never been explained so as to be within the comprehension of ordinary mechanics—but nothing is further from the truth. In regard to the chapter on pumps, the reader will get a good idea of its value when he learns that pumps are to be constructed on the following principles :—

Under no circumstances will the suction pipe of a pump be full, if the velocity of the water exceeds 500 feet per minute. The average "loss of action" of a pump varies from 20 to 40 per cent.

The above are, in brief, the reasons for thinking that the last chapters should have been omitted. It is no discredit, *per se*, to Mr. ROSE, that he does not understand all branches of engineering, in addition to being a good mechanic, but it certainly detracts from the value of his work when he attempts to treat of matters with which he is not conversant.

A PRACTICAL TREATISE ON THE TEETH OF WHEELS, WITH THE THEORY AND THE USE OF ROBINSON'S ODONTOGRAPH. By S. W. ROBINSON, New York. D. VAN NOSTRAND, 1876. 18mo., pp. 129. 50 cents.

IN the first part of this little treatise, Professor ROBINSON explains methods for laying down the teeth of wheels, both circular and non-circular, giving some of the best solutions that have been published, drawn from sources that are not readily accessible to the ordinary draughtsman. The explanations are so clear, and so fully illustrated by figures, that it will be easy for any one who studies this treatise to master the principles upon which the correct designing of gear wheels depend.

The second part is devoted to a discussion of the theory and use of a new odontograph designed by the author, which serves as a template for drawing the teeth of gear wheels. The advantages of this instrument over the well-known WILLIS odontograph, are shown to consist of greater simplicity in use, more accurate results, and a greater portability. Indeed, as regards accurate construction, this instrument seems to form teeth whose variation from those laid down by theory is too trifling to be considered in ordinary cases. The instrument is less six inches in length, and can be used for gear wheels of ten or more teeth, with pitches up to six inches. It is also suitable for laying out the teeth of racks and pinions, and for internal gearing—giving teeth with radial or curved flanks, as may be desired. We can recommend this little book to our readers as one of great interest and value, and the odontograph, to those who have gearing to design, as a valuable addition to their collection of instruments.

BOOKS RECEIVED.

NORWEGIAN SPECIAL CATALOGUE OF THE PHILADELPHIA EXHIBITION.
BRAZILIAN SPECIAL CATALOGUE " " "
ALGEBRA SELF TAUGHT. By W. P. HIGGS, M. A., etc. E. & F. N. SPON, New York and London. Price $1.
REPORT OF THE PENNSYLVANIA INSPECTORS OF MINES FOR 1875.
PENNSYLVANIA RAILROAD, HISTORICAL AND DESCRIPTIVE. By W. B. SIPES.
THOMAS ON HYDRAULIC APPARATUS FOR LOADING MINERALS INTO SHIPS.
ABSTRACTS OF PAPERS FROM FOREIGN TRANSACTIONS AND PERIODICALS.
MOORE ON A CURRENT METER, A DEEP SEA CURRENT, INDICATOR, AND AN IMPROVED SHIP'S LOG. INSTITUTION OF CIVIL ENGINEERS, London.
FERRO MANGANESE. ITS USES AND THE FACILITIES FOR ITS MANUFACTURE IN THE UNITED STATES. By WILLARD P. WARD, M. E.
SEVENTH ANNUAL REPORT OF THE GEOLOGICAL SURVEY OF INDIANA FOR 1875. Prof. E. T. COX.

CONTRACT FOR 300 MILES OF OIL PIPE.

WE have on several occasions noticed the high degree of excellence of the lap-welded enamel pipes, made by the NATIONAL TUBE WORKS COMPANY, of Boston, Mass., and McKeesport, Pa. No better confirmation of their excellence could be given than the recent contract made by this company, with the Pennsylvania Transportation Company, for 300 miles of 4-inch pipe to carry the oil from the oil regions to the seaboard. This is the most extensive order for pipe ever given in this country, and we believe the greatest length of pipe ever included in a single contract.

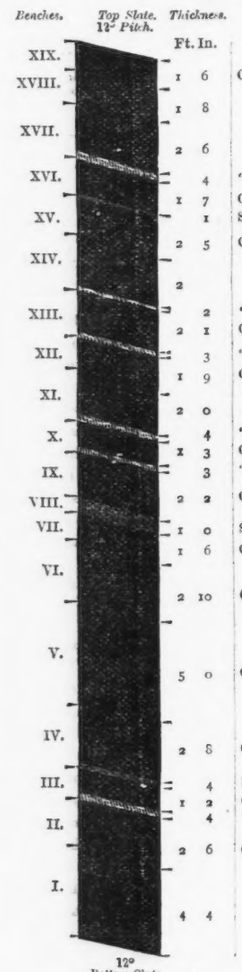
The National Tube Works Company's enameled lap-welded pipe is excellent for gas, water, or steam purposes. The enamel is not attacked by either acids or gases, and it affords a perfect protection to the iron in carrying the corroding waters which occur in many of the coal and metal mines. This pipe is largely used at the hydraulic mines in California, and for water and gas works in various places, and has given universal satisfaction, as this recent great order attests. Two other makers, besides the company mentioned, share in this enormous contract.

FOR THE PROTECTION OF WORKMEN who are obliged to handle lead and mercury compounds, the French chemist MELSEN recommends daily, but very small doses of iodide of potassium taken internally. MELSEN affirms that this substance dissolves the lead or mercurial compounds that are absorbed in the system, and effects their rapid removal.—*Der Metallarbeiter.*

THE MAMMOTH COAL VEIN SECTION AT THE EXHIBITION.

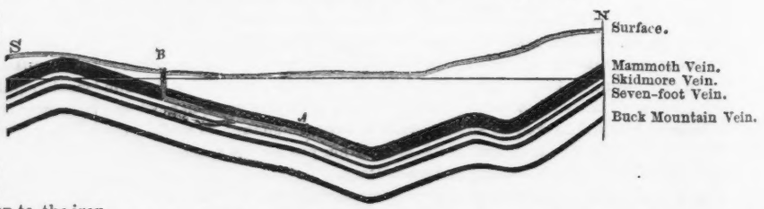
THE monumental column of anthracite coal in the center of the trophy in the Government Building at the Exhibition, was cut from the Mammoth vein at the Plank Ridge Colliery in Schuylkill County, Pennsylvania, at a distance of about 160 feet below the surface of the ground. As placed it shows the total thickness of the vein and the alternations of coal and slate, which are given in detail in the accompanying table and section.

SECTION OF THE MAMMOTH VEIN AT PLANK RIDGE COLLIERY, NEAR SHENANDOAH.
Philadelphia and Reading Coal and Iron Company.
Scale 8 feet per inch.



It will be seen that hard, bright coal, of a superior quality, alternates with what is called bony coal and slate. The good coal, however, very largely predominates, being in the aggregate 40 feet 11 inches thick ; while the bony coal is but 1 feet 8 inches in all ; and the slate, which, though often highly carbonized, is carefully separated from the coal before sending to market, is 1 feet 5 inches in thickness, making the total thickness of the vein, and consequently the height of the column of coal, 44 feet.

SECTION SHOWING VEINS WORKED AT PLANK RIDGE COLLIERY (P. & R. C. & I. CO.)
Scale 600 feet per inch.
NOTE.—*A*, Point from which column of coal was taken ; *B*, Plank Ridge Shaft.



It was of course impossible to obtain such a section as this in a single piece. It was therefore cut out with great care in benches, corresponding to the numbers given on the section No. 1 being at the bottom. The column is about 3 feet square, and has a total weight of about 18¾ net tons. Each of the nineteen blocks was securely cased and two platform cars were required to transport them from the mine to the Exhibition.

The annexed sectional diagram shows the Mammoth vein and the three veins

lying below it, the intermediate spaces being occupied by course and fine sandstone shales. The shaft of the colliery is indicated at B. and the point at which the coal was taken at A.

This interesting column is the contribution of the Philadelphia and Reading Coal and Iron Company, through FRANKLIN B. GOWEN, Esq., the President of the Company. Much credit is also due to General H. PLEASANTS and JOSEPH HARRIS, the Mining Engineers of the Company, and to the Superintendent of the colliery. As it was impossible to sustain such a high column without a rigid frame-work, application was made to SAMUEL J. REEVES, Esq. the President of the Phœnix Iron works, who supplied the beautiful iron platform and tower which supports the coal. This tower is constructed wholly of the Phœnix tubular column and the girders manufactured at that establishment. For greater security the coal is sustained upon three separate floors, one above the other, so that the weight of the entire column does not rest upon the lower layers of the coal.

The base of the trophy is formed by grouping large masses of marble, iron, copper and zinc ores, nickel ore, phosphorite etc., together with bales of cotton, sheaves of cereals, tobacco and other products of the soil and mine.

The greatest credit is due to PROF. W. P. BLAKE, who has charge of the collections of the Smithsonian Institute at the Exhibition, not only for securing this fine representation of our anthracite coal beds, but for the admirable collection of economic minerals and their products, which occupy so worthily a large space in the United States Government Building. Through the indefatigable efforts of Prof. BLAKE, guided by his wide acquaintance with the mineral districts of the country and his knowledge of the requirements of such a collection, are we indebted for this creditable illustration of the mineral wealth of the country. Had it not been for the Smithsonian Institute, and for its fortunate selection of an executive officer, the minerals of the United States would have had but a very indifferent representation. It is to be hoped that the results of so much labor will not be lost after the closing of the Exhibition by allowing this valuable collection to remain stowed away out of sight in boxes at the Smithsonian Institute. It should be placed "where it will do the most good," and to effect this end must be properly arranged, wherever it may be, and continually added to and completed under the direction of some such experienced and otherwise well qualified engineer as Prof. BLAKE. Why might not our Government follow the good example of the German Government and donate this collection to the Institute of Mining Engineers. In this manner it would certainly be productive of the maximum of good.

INTERNATIONAL EXHIBITION OF 1876.

Special Report of the Engineering and Mining Journal.

ADMISSIONS FOR THE WEEK ENDING OCTOBER 2, 1876.

Date.		Paying Visitors.	Press, Complimentary, and Exhibitors.	Total Visitors.
Previously reported.....	.....	4,146,478	1 230,411	5,376,889
Sept. 26	120th Day..	78,546	*12,000	90,546
" 27.....	121st " ..	93,030	13,229	106,259
" 28.....	122d " ..	257,169	17 770	274.919
" 29.....	123d " .	74,973	11,821	86,794
" 30.....	124th " ..	104,670	11,797	116,467
October 2.....	125th " ..	68,174	12,621	80,795
Totals.....		4,823 040	1,309,629	9,132,669

* Estimated.

GOLD EXHIBITS AT THE PHILADELPHIA EXHIBITION.—VII.

Special Correspondence of the Engineering and Mining Journal.

(*Continued from page* 216.)

UNITED STATES.

WHEN the vast extent and comparative accessibility of our gold mining districts to Philadelphia is considered, one feels somewhat disappointed at the exposition which is made of ores and illustrations of processes of mining at the Exhibition. The almost entire absence of maps showing the location of mines in the various districts, as well as sections and plans of individual mines, is also to be regretted. With one important exception, the gold and gold ores which are exhibited, are contained in the collection made by Professor W. P. BLAKE, for the Smithsonian Institution, which is placed in the Government Building.

The other display referred to is that made in the Colorado Building, which is within a short distance of the Government Building. The collection in the Government Building, is as a whole composed of what may be called working specimens, for although there are some pieces of ore which assay up in the "thousands," nearly all are fair samples of what are worked in quantity at the mines. The collection, therefore, has more interest from an economical and metallurgical point of view than when considered mineralogically.

The most striking of all the gold exhibits made in this collection, is that of the First National Bank of Helena, Montana. They have sent about forty specimens of wash gold, some of which consist of quite large nuggets weighing several ounces. These are from various placer mines in the Territory. The largest nuggets shown are from the Scratch Gravel and Highland Gulches. Several specimens of float gold or gravel pebbles, containing considerable gold are exhibited.

A specimen from the Uncle Sam Lode is quite interesting, from the fact that it contains gold and tellurium in juxtaposition without, it is said, any alloy having taken place between them. There are also a considerable number of crystals and crystalline forms of gold, which from their variety, will be very interesting to any one specially interested in the subject. A few specimens of gold taken from quartz lodes are included in this collection, two of which, from the Cable Mine, are very rich in massive gold.

From California a large number of specimens have been sent representing mines in Nevada, Amador, Butte, Eureka, Mariposa, Sierra, Calaveras, Placer, Yuba, Plumas, and Tuolumne Counties. Specimens of auriferous gravels from Nevada, Butte, Placer, Yuba, and Sierra Counties are shown, those from the Milton Mining and Water Company in Nevada County being particularly fine, and showing the presence of considerable quantities of coarse gold. The specimens from Nevada, Amador, Eureka, Mariposa, Plumas, Calaveras, and Tuolumne Counties are mostly quartz ores carrying pyrites, and sometimes galena and free gold. One of the specimens from the Idaho Mine, at Grass Valley, consists of a mass of free gold intermingled with crystals of pyrites, from the faces of some of which can be seen protruding fine filigrees of gold. A piece taken from the Plumas Creek Mine, in Eureka County, shows a complete section of the vein which was then about 16 inches thick.

The Nevada mines are represented by specimens from the Shamrock Mine, in Nye County, consisting of quartz containing considerable free gold; about 25 specimens from the Sierra Nevada Mine, Comstock Lode; iron stained quartz, containing free gold, from the Dayton Mine, Silver City, and quartz specimens from Humboldt County, containing free gold, the quartz being honey-combed from the decompositions of pyrites which it contained.

Oregon is represented by specimens of gold-bearing quartz, containing galenite from the Virtue Gold and Silver Mining Company, of Baker County. Quartz specimens from Owyhee and Alturas Counties, in Idaho, are shown; those from the first locality being iron stained, and sometimes containing pyrites. Nearly all these specimens show free gold. Rich specimens of float gold in quartz boulders from Boise County are shown.

There is a considerable display of silver ore, carrying varying quantities of gold from Utah, which will be noticed hereafter.

The telluride ores of Colorado are represented by a very fine specimen, from the Cold Spring Mine in Boulder County, which assays 15,000 dollars per ton in gold. The specimen shown is estimated to contain 400 dollars in gold. Auriferous pyrites from Boulder and Gilpin Counties made up nearly all the other gold exhibits from Colorado in the Government Building. In the collection shown in the Colorado Building there is a much more extensive display of ores of all kinds. The gold ores of Gilpin, Lake, Boulder, and Park Counties are there displayed in great numbers. A description of all these ores cannot here be given, but the telluride ores, from the American Mine in the Sunshine District, are of such value and importance, as to call for special notice. There are about fifty specimens in all from this mine, assays of which range from 5,000 to 127,680 dollars per ton. These extraordinary yields are, of course, from hand picked specimens, but, when their size is considered, the intrinsic value which they have can be realized. Some of the smaller specimens which have been roasted, show the gold alloy in buttons on the outside surfaces. This is, in many respects, the most wonderful collection of gold ores in the Exhibition.

Returning now to the Government Building, we find a few quartz specimens from North and South Carolina, and Georgia, which are of no special interest. A few scattering specimens in the Main Building, and a quite large collection belonging to the Central Pacific Railroad, which is exhibited in Agricultural Hall, complete the displays of gold and gold ores.

MINING NOTES FROM LAKE SUPERIOR.

Special Correspondence of the Engineering and Mining Journal.

THE season is so far spent that no new explorations are likely to be made until another year, but the indications are that next year will see considerable activity in this district Somewhere in this great network of veins must be spots where large concentrations of valuable metals have taken place, since small amounts of rich ore are met with over a great extent of country. It is unfortunate that Silver Islet is so unfavorably situated that extended exploration of the vein is impossible. The Diamond Drill has been at work on the main shore, but nothing was discovered except a fine vein of gangue. The drill has been removed back to the Islet to continue the exploration of the vein there. The force has been shortened down to twelve miners, who will sink the main shaft 400 feet deeper. All the indications are that other bodies of ore will be met with; and the report is, that if ore is not met with, half the expense of sinking will be paid from private means. The stamp mill has only sufficient supply of ore for two months' run during the Winter, unless fresh developments are made in time to get a supply to the land before the Winter sets in. The steam shovel that was employed to raise the dump ore that had been filled into the cribs, before the mill made it of value, did not prove as successful as was hoped, on account of the difficulty the men had to endure the cold water of the lake. There is still some very rich ore in the upper part of the mine, but it cannot be removed until the work below is abandoned.

There is no special news of interest from this district except reports from Pigeon River continue to increase the interest in this direction. Some very pretty specimens have been shown, carrying native silver; galena is also abundant, but an assay shows only a small amount of silver.

The "Elizabeth Mine" and "White Rose Vein" are the most favorable locations taken up by parties from St. Paul.

Other locations are being worked, as in the earlier part of the Summer, with no new developments.

The Dog Lake location has been improving in appearance, yielding large amounts of zinc, blende, and galena, the latter showing, by assay, some silver, but hardly in paying quantities at present. It is probable that by deep exploration good ore would be met with, as the same minerals are found at Silver Islet and Duncan Mines, carrying but little silver—even a few feet distant from the same mineral carrying 1,000 to 2,000 ounces per ton in native and sulphide.

The Algoma Company of New York are considering the matter of giving their property a thorough test. This mine is located on the extension of the Shuniah (Duncan) vein.

The Duncan Mine is attracting the most attention, because it is doing the testing for the whole district. The stamp mill was in operation on September 1st, and since has been doing very satisfactory work, showing that the ore can be concentrated at small expense. It is impossible to give the cost at this early day, as delays and breaks will increase it somewhat, but so far $4 per ton covers all the costs of mining, milling, and smelting the concentration, which latter item is at present $1.65 or $1.25 on a ton of concentrations. With the proper process, this can be reduced to a fifth part of present cost.

To understand what the mill is doing, it will be necessary to state in detail the character of the ore treated after a mere statement of machinery used.

The mill is but a few feet from the line of the vein at a lower elevation, so

that cars are dumped into the upper room with great ease, a track running parallel to the vein, with turn-tables opposite the shafts and mill.

A No. 2 Blake Crusher prepares the ore for the stamps, and by raising a grate the crushed ore falls into TRULLOCH'S automatic ore feeders, which give perfect satisfaction.

There are two batteries of 630 lb. stamps, made by Messrs. FRAZER, CHALMERS & Co., of Chicago, who supplied the larger part of the machinery. To each battery are two Frue Vanning Machines, the tailings from the first passing over the second, which completes the process. The mineral being finely disseminated, it is necessary to crush the ore quite fine. At the mine, there are now really but two grades of ore; A1 containing over 1 000 oz. per ton and stamp-rock, although four grades are spoken of.

A1 is cobbed out by hand; the assay of the last barrel shipped, 610 lb. net, was 1,510 oz. per ton.

No. 2 is the rock cobbed off. One day's run of the mill on 15 tons of this, gave 588 lb. of concentrations, assaying 1,440 oz., mean of both machines, making original ore about 35 oz.

No. 3 is the rock from the neighborhood of the silver, some pieces showing more or less ore.

The yield of the mill varies greatly according to amount of pyrites contained. From 15 tons there is obtained 350 to 600 lb. concentrations, which assay from 350 to 650 oz. per ton.

No. 4 ore is all doubtful stuff, that shows no mineral, but being the barren rock taken from the leaders, contains small bits of good ore, much pyrites, and, therefore, gives low grade concentrations; in amount 300 to 600 lb., assaying 170 to 260 oz., which, at present smelting cost, give but a small profit. At present the data of loss, and amount saved on second machines, are not sufficient to give reliable results, but at some future I time shall be able to give them, and thus show the true results obtained by Frue's Vanning Machines, which are apparently doing everything that is claimed for them. It is probable that the mill will pay all the expense of the mine, including expensive explorations; and it is to be hoped that new rich ground will be developed before the present is exhausted..

The stopes are opening up much richer than was expected, so that several hundred pounds of A1 ore have been taken out since Sept. 1st, when work was begun here. This yield, so far, has paid all the expense of stoping, so that the stamp rock is all gain. There is no reason why the ground should not be equally as rich for the next two years.

International Stock has taken a turn up, being the adjoining property to Duncan. Considerable work has been done on the large barren vein, without any discovery of ore, but the south leaders have not been looked for, though they appear to have either passed off in a different direction, or given out shortly after passing the line. The reason of this may be, that the dolomite, which cuts out the silver on Duncan, comes to the surface on this mine.

It would repay this company to expend some money in surface cuts, as there are other parts of their property that promise well. Beyond a few log cabins, they have no surface improvements. "EZUEST."

ABSTRACTS OF LECTURES ON MINING.—No. XIII.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(From the London "Mining Journal.")

[NOTE.—We are obliged to omit for the present the publication of Lecture No XII. but will give it in a few weeks. Our regret at this interruption is increased from the fact that it will cause several of our exchanges, that have been republishing the lectures from our columns—without credit to us, however, to disappoint their readers also.—Ed. E. & M. J.]

BORING.

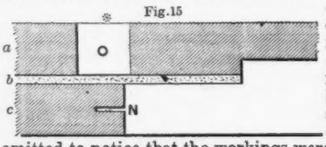
WE commence now to consider the question of boring, and will leave for the present those small operations where the boring is merely for the purpose of introducing a charge of powder, to examine what is termed earth boring, or deep boring. This consists in the putting down of holes from 1½ to 8 or 10 inches in diameter to a depth of from 10 to 2,000 or 3,000 feet, or in some few cases even to still greater depths. We may consider the objects for which bore-holes have to be employed under four divisions—1. For testing the character of the ground at moderate depths, as, for instance, for the foundations of buildings, or of piers for bridges, or of the ground through which a railway tunnel has to pass.—2. For exploratory and precautional operations in mining, particularly in mining in stratified rocks. These have especially for their object the proving of the existence, position, thickness, or quality of the various seams or strata through which it may be proposed to sink; or, in other cases, to relieve the principal workings of the water which may lodge there by tapping it off to a lower level, or to communicate between long galleries, so as to secure proper ventilation.—3. For affording an outlet to subterranean waters, which may be, perhaps, of a character intended for subsequent evaporation, as, for example, brine springs; or which may be intended for the water supply of a town, in which case these holes are usually termed artesian wells. —4. For the sinking of shafts; certain borers of considerable celebrity on the Continent have led their way up to this, and within the last 10 or 12 years it has been proved to be a decided success. This success is especially marked in districts which contain vast quantities of water, and where, if it were attempted to sink a shaft in the ordinary way, the expense of pumping machinery would be almost overwhelming.

With regard to the history of boring, it is not quite so recent an introduction as some people imagine; it seems to have been practiced in Europe in the seventeenth century. One of the earliest authors who wrote on this subject was a Frenchman, in 1729. He wrote an excellent treatise on the conditions under which artesian wells can be sunk with success, and pointed out those cases in which they are likely to be a failure; and also described the most successful methods employed for the purpose of putting down these wells. A little-known English book, called "A Familiar Discovery Concerning Mining Adventure," was published in London in 1700, which describes fully the putting down of bore-holes for the purpose of relieving certain of the lead mines of Wales. Although a comparatively recent introduction into Europe, one particular division of boring has been carried out in China. Up to the years 1820 to 1830 the system remained much in the same condition to what it had attained a hundred years previously; but since that time the intelligence and experience applied to it, especially in France and Germany, followed up in our own country and America, has produced a great complexity in the instruments used to adapt them to particular cases of difficulty.

In sinking bore-holes of the first class very simple apparatus may be used—wimples and scoops of various forms, according to the kind of rock. A very general form will be that of a cylinder, with a cutting edge round the bottom, and a slit up one side, looking very much like a gimlet, and, in fact, many of these are mere gimlets. They are worked by a handle on the tool, or by a bar of wood passed through an eye in the head of the tool; by a kind of rotatory movement soft matters, as sand, gravel, etc., may be removed. But when we have hard rock, and have to sink down to a considerable depth, we may proceed to consider them under the second class of boring operations. There are a great many cases in which the ground requires to be frequently tested, and therefore the coal owner or mining company will require to keep a set of boring rods always at hand, or even always going. And this is especially the case where the repositories are irregular, and do not make their appearance at the surface, but are covered by a considerable thickness of soil, as, for example, the hematite deposits of the Ulverston district, the great majority of which have been discovered by boring. I shall have to point out afterwards reasons for repeating the bore-holes in certain cases rather than putting down deeper ones, but at present I will merely intimate that, if you have a large tract to examine by means of bore-holes, it will depend very much on the judgment used in the manner of putting them down as to how far they will indicate the character of the ground. The expense of putting down these holes to great depths is very large; even in the hands of experienced people to carry it down to more than 1,000 feet will cost from £1,000 to £3,000. The value of bore-holes in stratified deposits depends upon the homogeneity of those deposits, and if that be well marked in the district the one bore-hole will give us a good deal of information. But, if, as in the majority of districts, there are irregularities and interruptions, due to faults, to pinching, etc., then a single bore-hole is by no means sufficient. Moreover, I have seen the instances where in a bed of coal 5 to 6 feet thick the marks of the bore-hole through it were visible, and yet the borers reported that no coal had been found. It is extremely important that samples of the materials passed through in a bore-hole should be kept, and very carefully labeled at the time, together with an account of the thickness to which the borers penetrated each. In the case of some of the deep continental bore-holes such samples are most carefully labeled, and kept for show after the hole has been put down, and even duplicate series are prepared. It might be the case more frequently than it is to have a set of boring tools belonging to the mine, and it would be well in many of our mines if the men were practised to this work, and a set of boring tools kept always employed. Examples of the use of such bore-holes may be very easily quoted. Where, for example, in one of the lower levels the air might be stagnant, in many cases a bore-hole sunk from a higher ventilated level, or from the bottom of a shaft above, will suffice to ventilate the working sufficiently, and thus save the expense of an engine to force air into the mine. In many of these cases, however, it is well to remember that we are not always certain of the direction which the ventilating current may take. Another instance of the utility of bore-holes is where you can drain an upper level by such a hole opened into a lower level, and communicating with the shaft where the pumping apparatus is at work.

There are other instances where the mine has been tested by horizontal bore-holes, where, for instance, such bore-holes are kept in advance of the actual workings when in the neighborhood of old workings, which may be full of water; and so important is this last precaution to the safety of the men, that the Inspectors under the Home Office are required to see that such are duly taken in the mines. These conditions occur in our eastern coal fields of Durham, Yorkshire, and Northumberland, where the old workings were shallow, and at higher levels than the modern deeper ones. The latter working up the seam approach the old workings, which may in many cases be full of water; the mining plans of the old mine cannot safely be relied on, inasmuch as they are frequently not brought up to the day of the conclusion of those workings. There is always a risk when you get within 50 or 60 yards of the limits of the old working (according to the plan), of the great pressure of water in the old mine—that is if it be present—forcing its way through, causing great damage to life and property, for these old plans were probably not brought up to the last day of working, then the few yards not accounted for may make a great difference. In all such cases, and whenever they are approached so near as to be associated with risk, it is desirable the horizontal bore-holes should be driven in advance; not one only, but three; one in the direct axis of the workings, the one on each side, at an angle of about 45°, in order to discover any side workings there might have been. The men must be supplied with long taper plugs, which at the moment of the water making its appearance must be driven in. The workings can then be carried in another direction, or the plug may be removed from time to time, so as to let as much water through as the engines can manage, with a view to draining the old mine. These advance bore-holes should be kept from 5 to 6 yards in advance. Another source of danger from inaccuracy in the old plans may be illustrated by a case which occurred in a coal mine in Cumberland some years ago. There were two beds of coal (*a*, *c*, Fig. 15) with a thin band or parting (*b*) between. The old plan marked an old working at the poin (*), and accordingly the men workingt now at the lower bed (at N) kept a bore-hole in advance, and finding no water at that point concluded there was no danger. Unfortunately, the old plan omitted to notice that the workings were in the upper bed (O); the result was that the water broke through the thin band between the workings (N and O).

Fig.15



Not only may advance bore-holes warn us of approach to water, but also may be used to indicate the proximity of large stores of fire-damp. And therefore, since fire-damp is apt to collect largely in connection with faults, it is desirable on approaching a well-known line of fault to test for the presence of volumes of this gas, stored under pressure, by means of small bore-holes. Cases have been known where the tension of this fire-damp was so great as to blow down 2 or 3 feet of coal; advance bore-holes will prevent any such calamity, by the means they afford of letting off the gas gradually in harmless quantities. Not only in horizontal workings may these advance bore-holes be desirable, but also in many cases of shafts sinking under similar conditions.

The borer consists of some heavy instrument of the scoop kind for soft ground, of the chisel kind for hard ground; it is suspended by rods of iron or wood to a swivel hook at the extremity of the apparatus by which the whole is worked. The form of the cutting edge varies according to the nature of the ground through which it has to pass; some borers prefer to have two cutting edges, at right angles to each other, others a cutting edge combined with a portion of the circumference of a circle, and so on. The rod and borer are raised a few inches, and then allowed to fall; the cutting edge being made to fall in a fresh place each time by the boremaster and his assistant turning round the rods by means of an apparatus which clutches them near the upper end.

CROSS SECTION

ON LANDS OF

THE COAL RIDGE IMP'T & COAL CO

NEAR MT. CARMEL,

NORTHUMBERLAND COUNTY, PA.

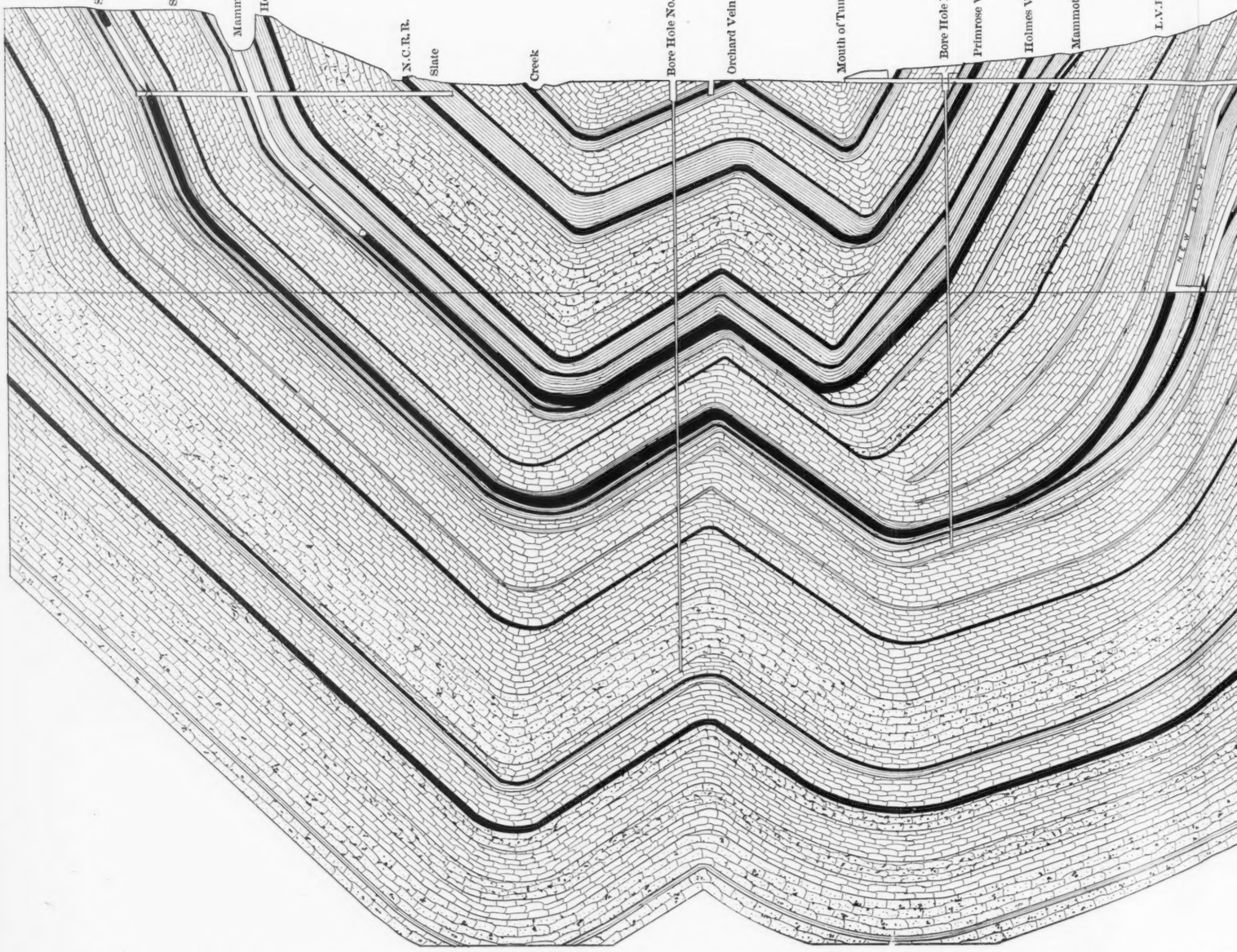
AS DEVELOPED BY BORE HOLES No. 5 & 10

ASHLAND, PA.

JUNE 1876.

Scale 200 feet - 1 Inch

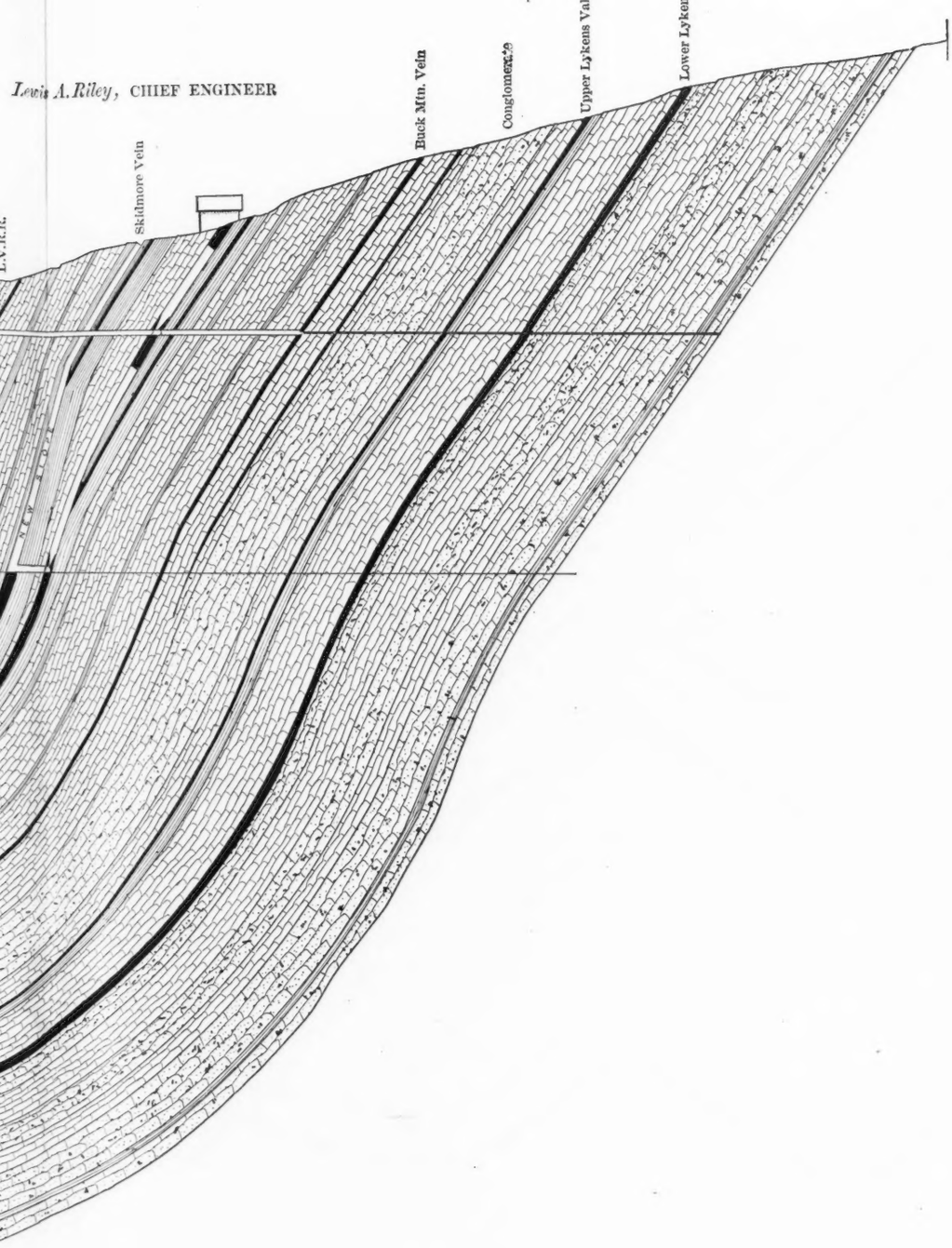
Lewis A. Ri



PPLEMENT, OCTOBER 7, 1876.)

OAL CO.

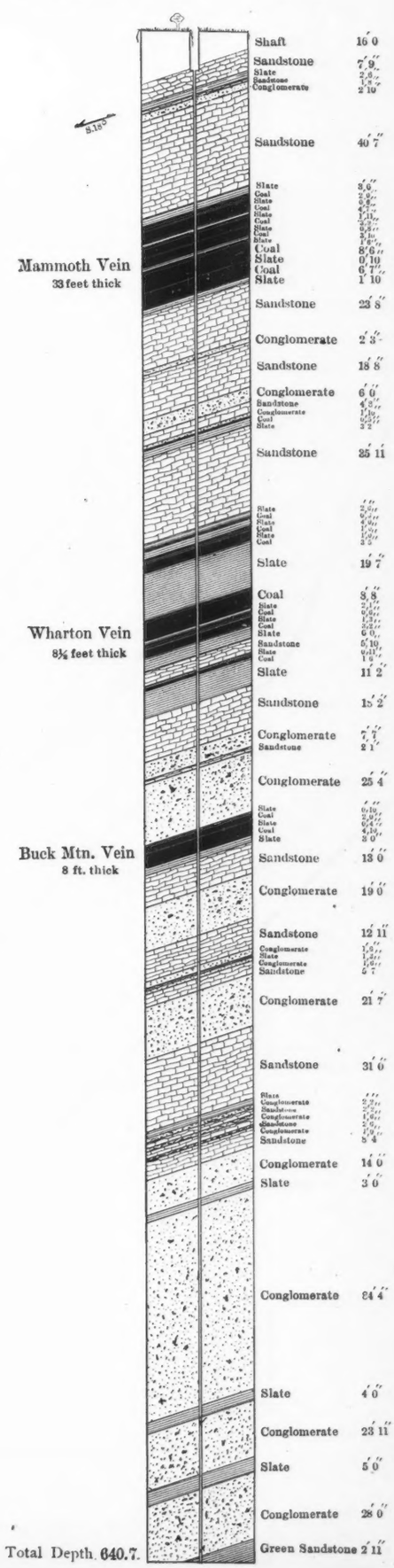
Lewis A. Riley, CHIEF ENGINEER



PENNSYLVANIA. By L. A. Riley, Ashland, Pa.

Section of the
LEHIGH VALLEY COAL CO'S
BORE HOLE NO. 19
NEAR HAZLETON, PENN.
June 1876

Scale 60 ft. per Inch



When a sufficient amount of rock has been broken, the *dèbris* is removed by lifting out the borer and putting down a tube—called a sludger—from 4 to 6 feet long, with a valve (either an ordinary trap-door or ball valve) at the bottom. This may be let down by the same set of rods, which is the most prudent, or by a rope, which is the most rapid; in the latter case the rope may happen to break, and the sludger be left in the hole, causing great difficulty and delay. When such misfortune occurs it is necessary to endeavor to lay hold of it with the nipper-like arrangement, or in case all such means fail, to chop it to pieces with the hardest steel instrument we can obtain, and then remove the pieces with a fresh sludger. Sometimes the rods are fastened together by a sword blade joint, but the best and most general mode is that of screwing. A small shaft is usually dug round the bore-hole, in which a man or two can be placed. When the rods are being withdrawn they are raised up, and the swelling just below a joint is caught on a fork until another joint is screwed on or off. In the case of interference by pebbles of quartz, pieces of iron, etc., the ingenuity of the boremaster will be called into play, and special instruments, in the form of corkscrews, fingers, etc., are employed to remove the obstruction. One of the greatest difficulties is where the rods break in the hold, and fall into an awkward position. Various instruments have been devised to meet such difficulties, but, in spite of all that can be done in some instances the hole has to be abandoned. For bore-holes of ordinary character the rods are about 1 inch square, jointed in lengths of 6, 9, 12, or 18 feet, or longer still for great depths, and they weigh about 22 lb. to a fathom. One of the most frequent modes of raising the rods in borings of moderate depths is by means of a windlass, with a slack rope, two men turning the windlass and one holding the slack. The great drawback is the wear and tear of the rope, and sometimes a chain is substituted on this account. The windlass is sometimes covered with hard wood, which covering can be renewed from time to time. Another plan, and one more satisfactory in a general way, is to use a lever, the rods being attached to the short arm, the men working the longer arm; the rods suspended by a swivel can be turned round, as described, by the boremaster. The latter can tell, by the kind of vibration, what the nature of the ground is, and what has been the result of the blow, and can accordingly regulate his work; he has complete control over his instrument even at great depths. In our coal districts another mode is often employed: a spring pole has one end fixed into the ground, a fulcrum is placed near to that, and the rods are suspended from the free end. The blow is struck by depressing the end of the beam, the rods are raised again by the elasticity of the beam. The lever and spring pole are both applicable to sinking bore-holes of a deeper kind, only then it is necessary to employ a steam-engine or other power in place of manual labor.

MR. SWANK'S OPINION OF SCIENCE IN THE IRON TRADE.

„ ALL through the two pages of bad breeding and coarse rhetoric which Mr. RAYMOND has seen proper to inflict upon his readers, the bitterness of his hatred of JOSEPH WHARTON is even more prominent than his contempt for the truth. The concealed cause of this malignity—so utterly barbarous that it could drag Mr. WHARTON into a controversy with which he had no lot or part whatever—is, perhaps, not so well known as it ought to be. Mr. WHARTON was forced into a defense of the Protective policy at the Philadelphia and Bethlehem dinners to Mr. BELL, because of the conspicuously inexact representations that had been made to Mr. BELL by Mr. RAYMOND, concerning the views of the ironmasters of this country on the question of Free Trade. It seemed to Mr. WHARTON wholly improper that so important a visitor as Mr. BELL should go home deceived about this matter by a person totally unauthorized to speak in any way for American Ironmasters, and he took his own way of correcting Mr. BELL'S impressions and Mr. RAYMOND'S statements. He spoke for other ears than Mr. BELL'S.

Mr. RAYMOND'S offense at Liège cannot be atoned for, at this late day, by an attempt to divest the remarks he there made of the cringing sycophancy which they displayed toward his British hearers, and the blistering insult which they conveyed to his own countrymen. He was there to beg the favor of the Iron and Steel Institute that it would visit this country in a body, an invitation which it has never accepted. His address was delivered to an audience composed exclusively of iron and steel manufacturers of Great Britain, who were then just about beginning to lose their strong hold upon the American market. Mr RAYMOND knew then, if he knew anything, that the American iron trade had been built up by the Protective policy, and that, without this policy, its very life would have been crushed out of it by British competition. Yet, what did he say? We quote from the official record of the Iron and Steel Institute. Assuming to speak for the members of the American Institute of Mining Engineers, he said:

'They recognize the fact that, above and beyond all such *temporary expedients as politicians or statesmen might devise*, and concerning which national economists might continue to be at difference, a people who knew how to do a thing would always do it. In Liège, *and in every country*, and in every branch of industry, the nation or individual that knew how to do was master of the situation; therefore, *in his country*, and in theirs, *it was a question of science fundamentally*, and ultimately of skill; in other words, of brain and study—of interchange of ideas—upon which *the whole success and prosperity of every industry rested.* Therefore, they in America represented a base, he thought, upon which they could cordially go to them, because they were not a society engaged, on the one hand, *in fighting their interests*, while on the other hand they invited them as their guests.'

We have italicized the parts of this servile speech which were insulting to the iron and steel manufacturers of this country, including those who were members of the American Institute of Mining Engineers. No flippant sentences which Mr. RAYMOND may now print can avail to shield him from the contempt and reprobation of all American ironmasters who are grateful for the benefits which the Protective policy has secured to them."—*Bulletin.*

A NEW ALLOY FOR BELL METAL is proposed, which does not tarnish, is less liable to crack, gives a better sound, and is much lighter in weight than the alloy usually employed for the purpose. It is prepared as follows: Nickel, 1 lb., and copper, 6 lb., are melted and cooled. Add zinc, 1 lb., aluminum, one-half oz. Melt and cool. Melt again, and finally add one-half oz. quicksilver, and 6 lb. melted copper.

MILWAUKEE IRON COMPANY.—At the meeting of the stockholders and creditors in Milwaukee, September 20th, nothing definite was done; an adjourned meeting was held October 5th. In the creditors meeting a general disposition to give the company time was manifested. The stockholders received favorably, but did not act on, a proposition to issue 20 per cent. additional stock, the amount to be paid in cash, in order to keep the works in operation.

NOVA SCOTIA GOLD DISCOVERIES.—Last week we noticed a discovery of gold that had been made near Rocky Lake, Colchester. Since then another good specimen has been obtained near the new mills of the Messrs. PATERSON BROS, on the DeBert River. No very thorough geological survey of that section of the country has ever been made, but it is well known that auriferous quartz is found in the range of mountains skirting New Annan, Tatamagouche, and the head of the DeBert and Folly Rivers. We hear of further discoveries at Carribou, in Musquodoboit. The new lead there is one of the best in the Province, if it continues as extensive and as valuable as at present. The lead is four feet thick, and is of the richest quality—yielding fully five ounces to the ton. Leases have been taken out, and $1,000, we are informed, have been offered for the small quantity of quartz that has already been obtained.—*Truro Sun.*

POCAHONTAS SILVER MINE, ROSITA COL.—The cross-cut from main shaft to vein at third level has just been completed, being 181 feet in length. As the vein has a dip of 20° towards shaft, each cross-cut from shaft to vein, as greater depth is reached, will be shorter until shaft strikes vein at 800 feet level provided dip remains constant. Third level will be 106 feet below second level, measuring on vein. Opening at this point shows wider pay and greater richness in gold and copper than upper workings. Assays heretofore showed only traces of gold. Assay just made from third level gives $48 gold. $1218 silver, and 20 per cent. copper.

The extraction of ore will be discontinued until the new Reduction Works in course of erection by Prof. E J. MALLETT, at Rosita, are completed. This will require about six weeks' time, perhaps. The ore will then be reduced there instead of being shipped to Denver or Black Hawk for treatment as heretofore. This will amount to a saving of at least $12 per ton; and as it is proposed to avoid assorting ore by hand, a much greater saving is anticipated. The present capacity of the mine is about 15 tons per day. Prof. MALLETT has reduced at Denver several hundred tons of Pocahontas ore by the leaching process, same as he is now preparing for at Rosita, so that his success appears well assured. H.

COST AND RESULTS OF GEOLOGICAL EXPLORATIONS WITH THE DIAMOND DRILL IN THE ANTHRACITE REGIONS OF PENNSYLVANIA.

By Louis A. Riley.

(WITH SUPPLEMENT.)

I DESIRE to submit, for the consideration and information of the members of the Institute, the following data, drawings, and tables, showing what I believe will be interesting information with regard to the Diamond Drill, and its uses in developing mineral lands.

I would first state that the results given have been obtained during the past two years by means of two drilling machines belonging to the Lehigh Valley Coal Company, and operating on their coal lands in the Mahanoy, Lehigh, and Wyoming Regions.

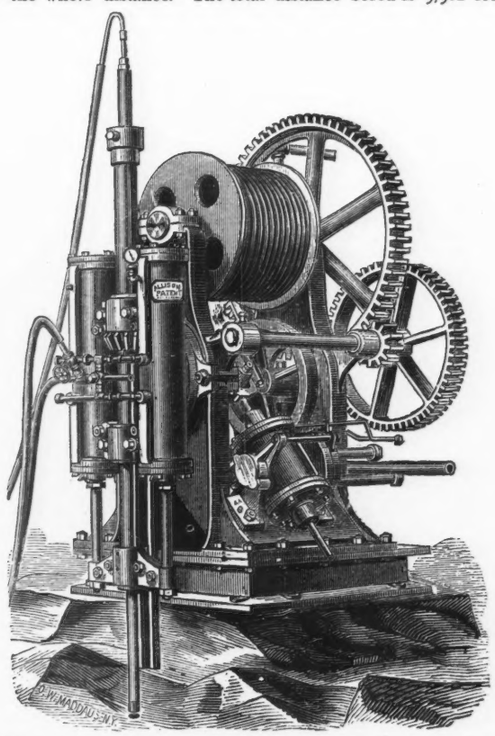
1st. A tabulated statement, giving location of borings, date, progress, total cost, itemized cost per foot, etc.

2d. Section showing strata bored in Nos. 5 and 10 holes at Mt. Carmel.

3d. Section showing strata bored in No. 19 hole at Hazleton.

4th. Photograph and description of drill No. 2.

From the first it will be seen that the total number of test holes bored up to May 1st of this year is 24, 9 of these are in the Mahanoy Region, 6 in the Lehigh Region, and 10 in the Wyoming Region, in all of which core has been taken for the whole distance. The total distance bored is 9,902 feet. The



IMPROVED DIAMOND DRILLING MACHINE, WITH ALLISON'S PATENT HYDRAULIC FEED.

Steam cylinders (oscillating), 6-inch diameter, 6-inch stroke, central spindle, 3-inch diameter, can be fitted to take rods from 1¾ inches up to 2¼ inches diameter. Hydraulic feed cylinders, 5 inches in diameter, 2 feet run, improved hinged swivel head swings to one side, out of way of drill-pipe. Spiral-grooved hoisting drum, 20 inches diameter, 16 inches long, grooved to take ⅝ or ¾-inch wire rope; drum double geared, so as to hoist heaviest rods with single rope. Reversing valve on engine, so as to hoist and lower at will.

Weight of machine, set up complete	3,486 lb.
" " without drum-gear and swivel head	2,195 "

Will drill a 2-inch hole 2,000 feet deep.

majority of the holes have been put down for the purpose of proving the lower veins of the coal series, and have had to encounter the harder rocks of the coal formation, much of the distance has been through the lower conglomerates, going in some cases through the coarse egg conglomerate, the foundation of the coal deposit, and to the green sandstone and red shale which underlie it. These lower sand rocks and conglomerates are among the hardest known to geologists, and present a formidable resistance to the exploring drill. This fact must be taken into consideration in comparisons of cost of drilling, and when considered will still further improve the very favorable results I am able to show in my statement of costs. In illustration, I will cite the work of one bit when boring in the upper or softer rocks of the Wyoming Region,

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, June, 1876.

when 280 feet were obtained without resetting, while in the Lehigh and Mahanoy Regions, in the lower and harder rocks, bits set with the same quality of diamonds would only bore from 3 to 20 feet before being worn out. In this connection it may be of interest to note the relative average distances from the Mammoth or Baltimore Vein to the red shale or green sandstone in the three regions, also the conglomerate rock found.

Region.	Dist. Mam. Vn. to Red shale.	Amt. Conglom.
Mahanoy	1200 feet.	840 feet.
Lehigh	490 "	190 "
Wyoming	650 "	300 "

In the Mahanoy and Lehigh Regions the coarse hard conglomerates predominate, while in the Wyoming they are of a softer and finer texture. We have two drills in constant use, No. 1 is the smaller and is the ordinary pattern used by the Pennsylvania Diamond Drill Company. This drill is run by a Root square engine.

No. 2, of which a photograph and description are given, is of an improved odsign of large size, with oscillating engine of fifteen horse-power, and performs its work in a highly satisfactory manner. During the past year it has drilled 9 holes, of a total length of 4,562 feet, without being once repaired, or incurring any cost outside of the ordinary running expenses. The deepest hole bored was 900·6 feet long, so that we have not yet had an opportunity to test its capacity of 2,000 feet, as given by the builders, Messrs ALLISON & BANNAN, of Port Carbon.

The cost of the drill, with movable boiler, 16-horse power, and 1,000 feet of two-inch drill rods, was $3,872·40. In addition to drill, boiler, and rods, our outfit, with each drill, comprises a set of machinist's and fireman's tools, a portable house, and a stock of diamonds sufficient to keep about five bits set for each machine, making a total cost of each drill and outfit of about $5,000.

Our portable house is a great improvement on the temporary sheds put up by the Drill Company. It is 16 feet square, built in sections of 8 feet by 3 feet, the frame, sides, and roof being fitted and held together with hooks; it can be taken down and put up by two men in one day, and affords a perfect shelter from the weather, and from trespassers.

Our labor force consists of a foreman, an engineer, and a fireman, with each drill, and an assistant superintendent in charge of both drills, or as many more as may be added. If it were not for the work and time of removing the rods, once for about every ten feet of boring, to obtain core, two men would be ample, but as it is, I find three men do the most work at the least cost per foot.

It is not necessary for me to state the value of the diamond drill for exploring work, as that is, probably, known to all the members of the Institute; it may be of interest, however, to know the method we employ for obtaining the most reliable information, and of putting it to practical use in our mining operations.

If our purpose is to develop the position and size of any coal vein, or series of veins, we select such a point, either on the surface, or inside the mines, as we think, from what data we have, is most likely to give the desired information. The solid rock is then exposed, the dip taken, and a stand-pipe set. The drill is then set up, house erected, etc., and the work begins. The hole may be level, or perpendicular, or at any angle between; it is better, however, that its direction should be at right angles with the measures, as this gives the shortest distance, and the core is less broken. As the work proceeds the core is removed and stored in long boxes, in the order in which it is bored. A minute record is kept by the foreman of amount and rate of progress, kind of rock, dip of strata, steam and water pressure, delays and causes, etc., when the hole is completed. Samples of the changes in the strata, with all the coal core, are retained, labeled, and stored in boxes, at the company's office, for future reference. Drawings are then made—one showing the stra a in detail, and the other a cross section through the basin, or locality of the boring. The first, generally on a scale of 30 or 60 feet to 1 inch, such as the section of the boring at Hazleton, submitted herewith; the second, on a scale of 100 or 200 feet to 1 inch, as the section at Mount Carmel, also submitted. One of the great defects of the Diamond Drill method, heretofore, has been a want of certainty as to the direction of the inclination of the strata as shown by the cores. We could tell, with reasonable exactness, the amount in degrees of the dip, but to which point of the compass we had to judge from indications outside the bore-hole. This defect, we think, has been satisfactorily overcome, in a device of Mr. THOMAS C. NASH, our assistant superintendent, called a pitch indicator. It is an attachment to the drill, by which the last piece of core which remains unbroken from the bed-rock, when the drill stops, is brought to the surface in the same position as when broken off, by the rods being raised by the hydraulic pressure. If this piece of core is marked by a seam in the strata, the dip and direction can be obtained accurately.

The accompanying table gives some interesting details with regard to cost rate of boring, etc.:

The total length of 24 holes bored is ..... 9,901·9 feet
The average progress per day is..... 18·9 "
The average cost per foot is..... $2.22

This includes labor, diamonds, fuel, water, supplies, repairs, expense of moving from place to place, etc., in fact, everything except royalty for use of patent right, and interest on investment and wear and tear, the last two items I estimate to be 20 cents per foot.

The average cost per foot for Labor is..... $1.15
" " " " " " Diamonds..... 0.66
" " " " " " Supplies, Repairs, etc..... 0.41

Our deepest holes I find to be the cheapest per foot, 8 of the number have been over 500 feet in depth, leaving out the first two for the purpose of comparison, as these two cost more than the rest by reason of being the first, I find the average of the deep holes to be per foot $1.95, while the general average without the first two is $2.10 per foot.

The diamond account has been a very difficult one to determine, owing to the fact that the same diamond is used over and over again in different holes, gradually depreciating until it becomes ground up into fine dust, or too small to either set in the bits or core barrels.

Our diamonds are bought in the quantity, the borts or real diamonds of light color, costing $11 per carat, and the carbons of dark color, costing $9 per carat. The bits are set with these diamonds, 5 of each kind weighing on an average about 18 carats per bit. When a bit is set with new diamonds, and sent out, if it was charged to the hole using it, that hole would be paying for diamonds, that would still be of use in other holes, and consequently our first holes would pay for all the diamonds. To get over this difficulty, as it was impossible to keep track of every individual diamond, I found it necessary to adopt some percentage to charge for loss. I had no data for this, other than the results of our own work, and to get it, the weights of diamonds in each bit, before using and after, were carefully noted, and amount of dust or fragments obtained. This being done with several bits, I found the depreciation in diamonds to be about 22 per cent., and to allow of some margin, I assumed it to be 25 per cent. or, in other words, that the value of the diamond was gone after being reset 4 times. I have recently revised this estimate, and with the results given from the use of some 120 bits, and from an inventory of diamonds and dust on hand, I find that I had previously over-estimated the loss, somewhat, that 18 per cent. was nearer the mark.

The costs per foot given in the table, on the basis of 25 per cent., are therefore slightly greater than the real amounts. I now assume the loss to be 20 per cent. and charge each hole with that percentage of the value of each bit used on it.

No. of hole	Location.	Date of Boring. Began.	Completed.	No. of Drill.	Diameter of Hole.	Diameter of Core.	Length of Bore Hole. Stand pipe.	Bore'g.	Total.	Progress per day, 10 hrs. Aver-age.	Maxi-mum.	Total Cost.	Cost per Foot. Labor.	Diam-onds.	Fuel, Water, Rep'rs etc.	Total.	Interest.	Total.	Remarks.
	PENNSYLVANIA.				in.	in.	feet	ft. in.	ft. in.	ft. in.	ft. in.								
1	Delano, Schuylkill County	April 14, 1874	June 11, 1874	1	2	1¼	13 0	501 8	514 8	10 1	20 0	$1,908 90	$1 63	$0 97	$0 28	$3 88	$0 20	$4 08	Coarse conglomerate; had to haul water.
2	Hazleton, Luzerne County	July 1, "	Sept. 26, "	1	"	"	8 0	682 0	690 0	9 3	36 7	2,189 43	1 63	1 14	0 41	3 18	0 20	3 38	
3	Aeband, Schuylkill County	Oct. 13, "	Nov. 6, "	1	"	"	26 3	344 4	370 7	14 8	34 0	957 19	1 41	0 79	0 38	2 58	0 20	3 78	
4	" "	Nov. 24, "	Dec. 8, "	1	"	"	20 4	258 7	278 11	13 9	26 9	941 62	1 66	1 36	0 41	3 37	0 20	3 57	
5	Mt. Carmel, Northumberland County	Jan. 15, 1875	Mar. 5, 1875	2	"	"	23 0	877 6	900 6	15 3	28 3	2,187 74	1 51	0 56	0 34	2 41	0 20	2 61	Preparatory shaft, deep and expensive.
6	Mahanoy City, Schuylkill County	Dec. 30, 1874	Feb. 27, "	1	"	"	23 0	350 10	373 10	7 2	20 0	1,512 35	1 99	1 57	0 48	4 04	0 20	4 24	Delayed with frozen water pipes.
7	Montana, Columbia County	April 16, 1875	June 5, "	2	"	"	62 0	655 5	717 5	14 9	33 9	2,193 90	1 64	0 70	0 55	2 95	0 20	3 15	Preparatory shaft, deep and expensive.
8	Mahanoy City, Schuylkill County	Mar. 24, "	April 7, "	1	"	"	30 9	250 10	281 7	19 3	33 7	795 00	1 25	0 94	0 63	2 82	0 20	3 02	
9	" "	June 2, "	June 9, "	1	"	"	41 0	122 11	163 11	17 6	23 4	572 10	2 29	0 49	0 73	3 51	0 20	3 71	
10	Mt. Carmel, Northumberland County	June 28, "	Aug. 27, "	1	"	"	27 0	695 10	722 10	13 2	24 0	1,216 03	0 85	0 40	0 43	1 68	0 20	1 88	
11	Pittston, Luzerne County	July 1, "	July 26, "	2	"	"	1 19	462 7	464 5	21 1	42 5	699 47	0 80	0 39	0 32	1 51	0 20	1 71	
12	" "	Aug. 5, "	Aug. 20, "	2	"	"	1 8	366 1	367 9	26 3	44 9	495 26	0 82	0 36	0 17	1 35	0 20	1 55	
13	" "	Sept. 3, "	Sept. 7, "	2	"	"	18 0	80	98 0	20 3	25 3	205 00	1 09	0 73	0 27	2 09	0 20	2 29	
14	Hazleton, "	" 13, "	Oct. 17, "	2	"	"	10 0	150	160 0	30 0	53 0	245 55	0 88	0 25	0 40	1 53	0 20	1 73	
15	Pittston, "	" 13, "	Oct. 9, "	1	"	"	11 8	599 7	511 3	21 3	33 5	501 15	0 59	0 88	0 11	0 98	0 20	1 18	Cheapest hole.
16	Hazleton, "	" 24, "	Sept. 29, "	1	"	"	11 6	139	150 9	27 8	39 8	288 40	0 97	0 47	0 47	1 91	0 20	2 11	
17	" "	Oct. 6, "	Oct. 15, "	1	"	"	16 6	126	142 6	15 9	23 8	334 69	0 97	0 71	0 59	2 27	0 20	2 47	
18	Wilkes-Barre, "	" 22, "	Nov. 27, "	2	"	"	0 0	536 3	536 3	17 3	28 5	832 19	0 78	0 45	0 32	1 55	0 20	1 75	
19	Hazleton, "	" 27, "	Dec. 18, "	2	"	"	16 0	624 0	640 0	33 7	32 8	1,370 30	0 88	0 73	0 53	2 14	0 20	2 34	
20	Pittston, "	" 9, "	Jan. 29, 1876	2	"	"	12 5	334 9	347 2	16 8	24 0	593 12	0 94	0 50	0 18	1 62	0 20	1 82	
21	Hazleton, "	" 17, 1876	Feb. 19, "	1	"	"	7 0	473 4	482 4	16 1	33 3	1,216 17	1 12	0 89	0 52	2 53	0 20	2 73	
22	Pittston, "	" 31, 1875	Jan. 17, "	2	"	"	18 7	303 3	321 10	23 9	28 4	322 24	0 65	0 20	0 15	1 00	0 20	1 20	
23	" "	Feb. 9, 1876	Feb. 25, "	2	"	"	27 0	350 0	377 0	26 9	29 4	396 58	0 67	0 22	0 16	1 05	0 20	1 25	
24	" "	Mar. 3, 1876	Mar. 18, "	2	"	"	8 0	280 5	288 5	20 6	46 3	385 20	0 59	0 60	0 15	1 34	0 20	1 54	
	Total								9901 9				$1 15	$0 66	$0 41	$2 22		$2 42	
	Average								18·9ft										

A DISSERTATION ON THE THEORY AND PRACTICE OF WINDMILLS.

By Alfred R. Wolff, M.E.

(*Continued from page 219.*)

EXPERIMENTS ON WINDMILLS.

THE experiments on windmills are only few in number; but, fortunately, these merit great consideration, having been made by engineers of renown who have expended all possible care to make the results accurate, trustworthy, and complete.

Smeaton's Experiments.—In 1758 the English Engineer, JOHN SMEATON, instituted a series of experiments with model windmills, in order to determine the best shape of sail for a given area of surface. Of one set of windmills experimented upon, the radius was 21 inches, the length of cloth, 18 inches; breadth, 5·6 inches, making an area of 100·8 square inches for each sail. In the second set there was added to each sail a triangular cloth whose base was one-half the breadth=2·8 inches, and whose height=18 inches, the sail broadest at the extremity, and the total area 126 square inches. Number of arms of windmill=4. On account of the uncertainty of the wind the wheel was moved, not by allowing or causing the air to move against the wheel, but by turning the axis progressively around in the circumference of a large circle, and thus causing the wheel to move against the air. The effect was then precisely as if the wind acted by its impulse upon the wheel. This turning of the wheel in the circumference of a large circle, was effected by giving a circular motion to an upright shaft, by means of a cord wound on a barrel upon it, operated by the experimenter. To this shaft was framed an arm 5½ feet long, at the end of which was the seat for the windmill. The power of the wheel was measured by having a scale pan attached to a fine cord, which wound about the shaft as it rotated, and thus raised the scale and weights therein. The scale moved up and down in the direction of the upright shaft and received no disturbance from the circular motion. SMEATON has clearly given the results of his valuable experiments in the form of a table, and the correct deductions therefrom in the form of maxims. SMEATON adds, in a note, to his article: "I have found, by several trials in large, the following angles to answer as well as any. The radius is supposed to be divided into six parts, and one-sixth reckoning from the center is called 1, the extremity being denoted 6. No. 1, 2, 3, 4, 5, 6 angles with the axis 72°, 71°, 72°, 74°, 77½°, 83° angle with the plane of motion (angle of weather); 18°, 19°, 18° middle, 18° 12½°, 7° extremity. These angles are those quoted in text-books, and engineering pocket-books, as the *best* angles of impulse and weather as determined by SMEATON; but it must be expressly understood that SMEATON does not term them the *best* angles of impulse, but simply says they are as good as any (probably any that were in existence at the time); and even this statement is too general, and must be taken with due allowance. Mathematical considerations show, conclusively, that the angle of impulse depends on the relative velocity of each point of the sail and the wind, the angle growing larger as $\frac{v}{c}$ becomes greater.

It will be noticed that SMEATON's angles do not fulfill this condition, the angle of impulse at No. 2 being less than at No. 1, while the velocity is twice as great.

The writer would strongly impress the fact, that no *general* statement for the best angles of impulse can be made; for, as the velocity of the windmill depends on the work done, the best angles of impulse must be made a special study for each particular case.

SMEATON'S MAXIMS.

1. The velocity of the windmill sails, whether unloaded, or loaded so as to produce a maximum, is nearly as the velocity of the wind, their shape and position being the same.

2. The load at the maximum is nearly, but somewhat less than, as the square of the velocity of the wind, the shape and the position of the sails being the same.

3. The effects of the same sails at a maximum are nearly, but somewhat less, than as the cubes of the velocity of the wind.

4. The load of the same sails at the maximum is nearly as the squares, and their effects as the cubes of their number of turns in a given time.

5. When the sails are loaded so as to produce a maximum at a given velocity of the wind, and the velocity of the wind increases, the load remaining the same: first the increase of effect, when the increase of the velocity of the wind is small, will be nearly as the squares of those velocities; secondly, when the velocity of the wind is double, the effects will be nearly as 10 to 27½; but, thirdly, when the velocities compared are more than double of that where the given load produces a maximum, the effects increase nearly in a simple ratio of the velocity of the wind.

6. If sails are of similar figure and position, the number of turns in a given time will be reciprocally as the radius or length of the sail.

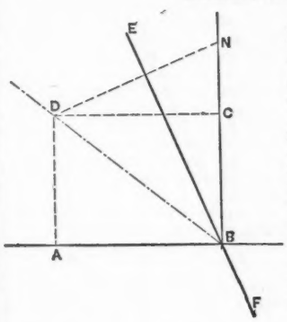
7. The load at a maximum, that sails of similar figure and position will overcome at a given distance from the center of motion, will be as the cube of the radius.

8. The effects of sails of similar figure and position are as the squares of the radius.

9. The velocity of the extremity of Dutch sails, as well as of enlarged sails, in all their usual positions when unloaded or even loaded to a maximum, is considerably quicker than the velocity of the wind.

Coulomb's Experiments were made on one of the mills near the city of Lille, in Flanders, used for the extraction of oil from rape-seed. The windmill experimented upon had the following dimensions: radius of sail=33 French feet (pied de roi, 1 French ft.=$\frac{32,484}{30,479}$ English feet); breadth of sail=6·2 French feet, 5·2 of which were composed of cloth upon a frame. Distance from axis of shaft to beginning of sail proper=6 French feet; angle which element at this point made with the axis of the shaft=nearly 60°; angle which element at the extremity of the sail made with the axis=78°. The shaft was pierced by seven beams 42 inches long, which formed cams for raising seven stampers twice during each revolution of the wheel. Of these seven stampers, five employed for pounding the rape-seed were of oak 21 feet long, by 10 inches square, furnished with an iron head of 55 lb., and weighed 1,020 lb. each. The two other stampers, used to clasp and slacken the wedges extracting the oil by strong compression, were of the same length, 6·5 inches square, and weighed 500 lb. Only one of these stampers was used at the time of the experiment. The velocity of the wind was measured by light feathers which the wind carried along; two men placed on a small elevation, 150 feet from each other in the direction of the wind, observed the time required by the feathers to travel the 150 feet. The velocity of the wind, as thus obtained, was 20·5 feet per second, the mill making 13 revolutions per minute, the four sails having all their canvas spread. The actual mechanical effect produced in one minute equals (1,020×5×2×13+500×13) lb. raised 1½ feet, which equals 1,000 lb. raised 218 feet in a minute. The effect lost by the shock of the pieces acting as cams, and the stampers, was calculated by the application of correct mathematical formulæ, and found equal to 1,000 lb. raised 16½ feet per minute. The loss of effect by friction was found, by experiment, equal to 1,000 lb., raised 18½ feet per minute. COULOMB, therefore, found for the total mechanical effect exerted, due to the impulse of the wind on the above windmill, the velocity of the wind being 20·5 French feet per second, and the number of revolutions of the wind-wheel being 13 per minute—1,000 lb. raised 218+16½+18½=253 French feet per minute.

MATHEMATICAL CONSIDERATIONS.



The following is a method of solution for the mechanical effect of a windmill sail based on the methods employed by the writers of the last and the first part of this century in the computation of the impulse of fluids on vanes.

Let AB = c represent the direction of motion and velocity of the wind. Let BC = v perpendicular to AB represent the direction of motion and velocity of any element of the sail. AB is ⊥ to BC because the direction of motion of each point of the surface of a windmill sail is perpendicular to that of the wind. Then the wind moving in the direction AB with a velocity c and the element of the sail moving in a direction BC with a velocity v, the effect of these motions would be the same as if, the air being at rest, the sail moved in a direction BD with a velocity equal BD = $(c^2 + v^2)^{\frac{1}{2}}$; or, as if the wind moved in a direction DB and struck the sail with a velocity $(c^2 + v^2)^{\frac{1}{2}}$, the sail being at rest.

Let the angle of impulse $\angle ABF = a$; let $\angle DBA = B$, then $\angle DBE = 180° - (a+B)$

$\sin(180° - (a+B)) = -(\sin a \cos B - \sin B \cos a)$

AB = DB cos DBA $\therefore$ $(c^2+v^2)^{\frac{1}{2}} = c$ sec. B.

Let Q = quantity of wind in cubic foot flowing along per square foot.

" d = density of wind.

" k = ·93 = co-efficient of friction of particles of air in motion. (See page 203.)

" S = surface of sail in square feet.

" F = pressure in pounds exerted by the wind normally to the surface.

$F = \frac{SkQd}{g} \cdot (c^2 + v^2)^{\frac{1}{2}} \sin(180 - (a+B))$; substituting for Q its value c,

$F = -\frac{SKcd}{g} c \sec. B (\sin a \cos B - \sin B \cos a)$;

$F = -\frac{SKcdc}{g}(\sin a - \tan B \cos a)$; $\tan B = \frac{v}{c}$, therefore

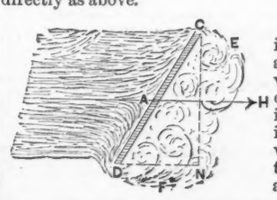
$F = -\frac{SKc^2 d}{g}(\sin a - \frac{v}{c}\cos a)$

To find what part of this pressure is useful in causing rotation we resolve it into two components, one perpendicular to, and the other in the direction of BC. The former produces no beneficial effect, on the contrary, increases the pressure on the journal, and thus gives rise to a loss of effect by friction. The component in the direction BC, however, is that part of the pressure exerted which is entirely utilized and represents the useful pressure on the sail. Let this pressure be represented by L. Then $L = F \cos(90 - (a - 90)) = -F \cos a = +\frac{SKc^2 d}{g}(\sin a - \frac{v}{c}\cos a)\cos a$. This multiplied by v, the velocity of the sail in feet per second, gives for the theoretical mechanical effect of the windmill sail $L\,v = \frac{SKc^2 d}{g} v (\sin a - \frac{v}{c}\cos a)\cos a$ .... (A)

RANKINE in his "Steam Engine and other Prime Movers" finds the following value for the theoretical mechanical effect due to the impulse of water on a flat vane:

$Pv = \frac{DQvc\cos\zeta\cos\delta - v^2\cos^2\delta}{g}$. When applied to windmills it must be remembered that the direction of motion of each point of the sail is perpendicular to that of the wind and the following substitutions can accordingly be made: $\delta = 90 - \zeta$ $\therefore$ $\cos\delta = \sin\zeta$ and since $a = \delta$, $a = 90 - \zeta$ $\therefore$ $\zeta = 90 - a$ $\therefore$ $\sin\zeta = \cos a$, $\cos\zeta = \sin a$. $Pv = \frac{DQcv \sin a \cos a - v^2\cos^2 a}{g}$ and substituting L for P, S for the area of surface in square feet and $k\,c\,d$ for Q D, "the weight of water flowing along the stream per square foot in a second."

$Lv = \frac{Skdc^2}{g} v (\sin a - \frac{v}{c}\cos a)\cos a$ which is the same as formula (A), found directly as above.



WEISBACH deduces (see "Weisbach's Mechanics" edited by WALTER R. JOHNSON, page 354) a value for the theoretical mechanical effect of which the errors in solution can be best pointed out by quoting a passage: "If c=the velocity of the sail, Q=the quantity of wind striking on CD per second, γ=the density of the wind and a=the angle CAH which the direction of the wind makes with CD, then, on the assumption that the plane moves away in the direction of the wind, the normal impulse of the wind on CD is $N' = \frac{c-v}{g}\sin a$ Qγ. Putting the section CN=G, then the quantity of wind Q coming into action is not Gc, but G$(c-v)$ as the sail moving with the velocity v leaves a space Gv behind it, which takes up a proportion of the quantity of wind Gc following it, equal to Gv without undergoing any change of motion. Hence the normal impulse may be put $N = \frac{c-v}{g}\sin a(c-v)\,G\gamma = \frac{(c-v)^2}{g}\sin a\,G\gamma$ or if F=area of the element CD, and we substitute F sin a for G, then $N = \frac{(c-v)^2}{g}\sin^2 a\,F\gamma$. Besides this impulse on the face of CD, there is a counteraction on

the back, in as much as one part of wind passing in the direction CE and DF, at the outside of the plane, takes an eddying motion to fill up the space behind, and consequently loses pressure corresponding to the relative velocity $(c-v)$ sin a, and represented by $\frac{(c-v)^2}{2g}\sin^2 a\,F\gamma$. If we combine these two effects, we get the normal impulse on the element of the sail." On examination it will be seen that the relative velocity of c and v, *i.e.*, the fact that while the wind is moving with a velocity c, the sail moves with a velocity v, and therefore, the wind actually strikes the surface with a velocity $(c-v)$, is taken into account twice. Instead of the normal impulse N reading $N=\frac{(c-v)^2}{g}\sin a\,G\gamma$, it ought to read $N=\frac{(c-v)}{g}c\sin a\,G\gamma$, for in deriving the expression $N'=\frac{c-v}{g}\sin a$ the consideration of the quantity of wind striking with a relative velocity $(c-v)$ is adopted, and it is wrong to do the same thing for the second time. Besides this impulse WEISBACH adds another term, which, as is explained below, it is not correct to add. He assumes correctly that the wind rushing past the sail produces a partial vacuum behind it, and that this must be replaced by air. But is it not probable that the vacuum will be filled up by wind of original velocity, and that that wind having lost part of its velocity by impact, only tends to fill up the empty space left by this wind of undiminished velocity? It is certain that as soon as one "line" of wind has struck the surface, it glides along the surface with diminished velocity, and simply forms a moving cushion on the sail upon which the wind with its originial velocity impinges. This fact alone suffices to disprove WEISBACH's theory.

From all of the above considerations, the writer thinks it correct to adopt as the theoretical mechanical effect of a windmill sail, the expression $Lv=\frac{Skdc^2}{g}v\left(\sin a-\frac{v}{c}\cos a\right)\cos a$.....(A), and, in finding the actual mechanical effect, simply to make a deduction for loss of effect by friction of the shaft, considering a vacuum to be formed behind the sail, and therefore assuming the resistance of the air to be equal to nothing.

TO BE CONTINUED.

PROJECT FOR THE ERECTION OF BLAST FURNACES IN NEW JERSEY.

By William Kent, M.E.

(*Continued from page* 218.)

Volume of Air Required.—From the calculation already given (distribution of charges, No. 2,) we have seen that the weight of air required for each 100 pounds of pig iron procured, using 48.22 per cent. ores, is 743.5 pounds.

If the furnace makes 300 tons of pig iron per week, which is equivalent to 66⅔ pounds per minute, the amount of air required per minute will be $66\frac{2}{3}\times 743.5\div 100=495.617$ pounds. One pound of air at 32° F., and atmospheric pressure being equal to 12.387 cubic feet (Rankine), the volume of air required per minute,

At	32° F and atmospheric pressure is	495·667 ×	12·387 =	6,139·82	cubic feet.
At	60° F " " " "	6,139·82 ×	$\frac{60+461\ 2}{493\cdot2}$ =	6,488.39	" "
At	60° F " 8 lb. above atmos. press. is	6,488·39 ×	$\frac{14\cdot7}{22\cdot7}$ =	4,201·73	" "
At	1000° F " atmospheric pressure is	6,139·82 ×	$\frac{1000+461.2}{493.2}$ =	18,190·40	" "
At	1000° F " 8 lb. above atmos. press. is	18,190·4 ×	$\frac{14\cdot7}{22.7}$ =	11,779·64	" "

The engine, therefore, will be required to furnish to the air-receiver 6,488·39 cubic feet of air of atmospheric pressure, and temperature of 60° F. It must be designed, however, to furnish much more than this, on account of the leaks which almost unavoidably occur in the ovens and around the tuyeres, and of the amount required for the pneumatic hoist, and for special emergencies. If it be found that the furnace will produce, without damage, a greater quantity of iron than the amount assumed, more air will be needed, and the engine should be capable of supplying this extra demand. There is little danger of having the engine too large. If it should furnish a surplus of air, it may be run at a lower speed, although at a loss of economy of steam. (This loss, however, is not of any account in the present methods of working.) Where there are two or more engines, it is well to have them so adapted, that in case of a break-down of either of them, the other may be ready to do extra duty. In this case, therefore, where there are two engines, one for each furnace, each will be designed to be capable of giving about 50 per cent. more blast than that calculated above.

Type of Engine.—The kind of engine selected, is that built by the I. P. MORRIS Company of Philadelphia, who have built a large number of engines furnaces in the Lehigh Valley and elsewhere. One of their engines is now to be seen at the Centennial International Exhibition, which almost exactly fulfills the required conditions. It is a vertical condensing engine, of the same type as those lately built for the furnaces at Philipsburg and Secaucus, N. J., with improved equilibrium poppet valves, operated by cams geared directlly to the main shaft. The following are some of its principal dimensions: Total height, 36½ feet; air cylinder, 90 inches; diameter steam cylinder, 50 inches; length of stroke of each piston, 7 feet; two fly wheels, diameter of each, 24 feet; average weight of each, 39,770 pounds; total weight of engine, 214,794 pounds.

If this engine is run at a speed of 16 revolutions per minute, or 224 feet piston speed, which is about the average in the Lehigh Valley, the volumes swept through by the air piston in each minute will be $7\frac{1}{2}^2\times\cdot7854\times7\times2\times16=9896\cdot03$ cubic feet.

The air inhaled by the engine will be this amount, at atmospheric pressure, less a slight allowance for loss of pressure by friction in passing through the entrance valves. The loss, however, will be exceedingly small, as the valves have a large area, and are well designed to permit the entrance of air as freely as possible.

The air will be required to be delivered to the furnace at 8 pounds per square inch above the pressure of the atmosphere, this being the pressure adopted by many of the anthracite furnaces. Sometimes in cases of bad working of the furnace, 10 pounds pressure is used, and this figure will be used in calculating the power of the engine, and the amount of steam required to drive it.

Power.—The horse power of the air cylinder is found from its dimensions by the formula

$$HP=\frac{N\,A\,L\,P\ \text{hyp. log}\ \frac{P_1}{P}}{33{,}000}$$

Where N is the number of double strokes per minute, A the area of the piston in square feet, L the length of a double stroke in feet, P the pressure of the atmosphere, and P_1 the total pressure of blast in pounds per square foot, we have therefore

$$\text{Horse Power}=\frac{9896\times2116\cdot8\times\cdot6188}{33{,}000}392\cdot8$$

The area of steam cylinder required to develop this power in the air cylinder will be

$$A_1=\frac{33{,}000\,H\,P}{P_2\,L\,N}$$

where L and N are the same as before, and P_2 is the mean steam pressure above the pressure in condenser. The mean steam pressure will depend upon the initial pressure and the point of cut off. The latter is said to be in the engine described at ⅛ of the stroke. If we assume the mean steam pressure above the condenser to be only 30 pounds, which is a low figure in practice, we have $A_1=1339\cdot5$ square inches, or adding 10 per cent. for friction, clearance, etc., $A_1=1473\cdot5$ square inches, whence the diameter of cylinder required is 43·3 inches.

The diameter of the steam cylinder of the engine described is 50 inches, which seems unnecessarily large, and, in fact, it is larger than is commonly used with same size of air cylinder. The large size, however, will be an advantage if the steam pressure should be lower, or if a higher grade of expansion should be employed

Air Receivers.—For the purpose of avoiding fluctuations in the pressure of the blast at each stroke of the engine, the air is carried into a large receiver before it is led to the ovens. The size of the receiver varies greatly at different furnaces, but 6 to 8 times the size of the air cylinder seems to be a fair proportion. At some furnaces, the receiver is made part of the pipe which carries the air to the ovens, this pipe being made of a larger size to serve its double purpose. In the present design we shall combine both plans, making a separate receiver and also enlarging the air pipes. The capacity of the cylinder being 309·25 cubic feet, the receiver is made 6 feet in diameter and 70 feet long, containing a volume of 1,980 cubic feet. There will be two receivers contained in the engine house, and so arranged that they may be connected together with both engines, or one used with each engine, in case a larger pressure of blast should be required at one furnace than at the other.

Air Pipe.—The pipe carrying the cold air from the receivers to the ovens must be of such capacity that its friction will not seriously diminish the pressure of the blast. OSBORN gives the following rule for blast furnace practice: "When 1,000 cubic feet of air per minute are required to pass through a pipe of medium length, the diameter should be at least 10 inches. Each additional 1,000 cubic feet should have the same space, so that 4,000 cubic feet per minute should require 20 inches, 9,000 cubic feet 30 inches, etc."

Making this pipe 36 inches in diameter, so as partly to serve for a receiver, the loss of pressure by friction is almost nothing. PERCY gives the following formula for calculating the loss by friction $p^1=\frac{fSv^2}{Ma}$ where p_1 is the loss of pressure in pounds per square foot, f the surface of pipe, v the velocity in feet per second, S the weight of a cubic foot of the passing air, a mean sectional area of pipe in square feet, and Ma co-efficient of friction which may be approximately taken at 10,000. Applying this formula to the present case, taking 60 feet for the length to the middle oven, we find a loss by friction of only 0·21 pounds per square foot, or 0·0015 pounds per square inch.

HOT BLAST OVENS.

In designing the hot blast ovens, regard must be paid to several considerations. The heating surface must be sufficient to convey the heat from the burning gases to the air while it is passing through. The blast area through the pipes must be large, both to avoid loss of pressure by friction, and to insure such a low velocity that the air may remain long enough in the oven to absorb sufficient heat. The arrangement should be such that the gases will be thoroughly burned, and that their heat shall be abstracted as much as possible before they are allowed to escape. The air jets should be so placed that the supply of air may be regulated, so that enough may be admitted to burn the gases, but not enough to dilute them so that their temperature is seriously reduced. At the same time precautions must be taken to prevent burning or cracking of the pipes through excessive or irregular heat reaching any part of them. Finally, there should be a sufficient number of ovens to allow of one or more of them being out of use at any time for cleaning or repairs, without injury to the furnace.

The present design includes six cast-iron hot blast stoves for each furnace, arranged in three pairs. They are similar to most of those built at anthracite furnaces within the last few years. They are not copied after any one furnace, but combine what are believed to be the best features of those at Bethlehem, Secaucus, and Durham. The pipes are of the same diameter as those at Bethlehem, but a little shorter, and larger in all dimensions than those at Secaucus and Durham. The arrangement of the pipes is that adopted at Durham. Eighteen pipes are set in each oven, in three rows of six pipes each. The foot of each pipe is connected with the foot of the one next it in the row, by a short bed-pipe, large enough to contain a single foot of two pipes only. At each end of the oven the ends of the three rows are connected by a single bed-pipe.

The combustion chamber underneath the ovens, which is left out at Durham, is here retained, as at most furnaces. The gases issue from the combustion chamber, through openings in the arched brickwork which supports the pipes, and pass up through the pipes and over a high partition wall in the middle of the oven, thence down into the exit flue which connects all the ovens with a tall chimney. The tall chimney is not used at all furnaces, some having small chimneys on top of each oven. The former plan seems preferable, both to insure a draught and to carry the gases above the top of the furnace, where they might incommode the workmen.

The covers of the ovens are the same as those used at Secaucus, designed by Messrs. TAWS & HARTMAN, of Philadelphia. They consist of cast-iron plates lined with fire-brick, made for the purpose. They afford a good covering, and at the same time are easily removable in order to effect repairs to the pipes in case any of them should be found cracked or broken. The jet burner, an invention of the same firm, is also used with these ovens.

The Whitwell hot-blast stoves, which dispense with the cast-iron pipes, have been introduced in Europe with great success, and they might be employed in the present design, but it is doubtful if the increased cost they would necessitate would be justified by their slight increase in economy. At the present time there is only one anthracite furnace in the United States where they have been used, the Cedar Point Furnace at Port Henry, N. Y. They are highly

recommended by the manager, Mr. T. F. WITHERBEE, but the records show that only a very slight saving has been made by them. If, however, further trial shows them to have any important advantages in furnaces using anthracite it may be found well to modify this design so as to include them. The ground plan, hereafter to be described, has been arranged with this view, so as to be adapted for either kind of oven.

Dimensions.—The heating surface used in practice is about two-thirds of a square foot for each cubic foot of blast per minute, but is sometimes more and sometimes less than this. The proposed ovens have the following dimensions, 6 ovens for each furnace, each with 18 pipes. Each pipe 10 inches external and 8 inches internal diameter. Height of pipes 15 feet. External heating surface of each pipe $\frac{10\times3\cdot1416\times30}{12}=78\cdot54$ square feet. Internal heating surface of each pipe $\frac{8\times3\cdot1416\times30}{12}=62\cdot832$ square feet. The heating surface of the bed pipes is not taken into account, as they will probably be covered with dust. Blast area, each pipe $8^2\times\cdot7854=50\cdot265$ square inches. As the blast enters six ovens at once under ordinary circumstances, and each oven has three currents of blast, one through each row of six pipes, the total blast area is the area of 18 pipes, or $18\times50\cdot265=904\cdot47$ square inches$=6\cdot28$ square feet. The bed pipes have each an internal section of 9 inches square, so that they offer no obstruction to the blast.

A calculation might here be entered into, showing the theoretical heating power of these ovens, based upon the data of the quantity of air passing through them, and its velocity and initial temperature, the temperature, specific heat, volume, and velocity of the burning waste gases, and the known laws of combustion and transfer of heat. The writer is not aware that such a calculation has ever been attempted, with reference to blast furnace ovens, and it would probably prove of no present practical value, as many of the data would have to be assumed, for want of exact knowledge concerning them. The present design professes only to be "practical," and the dimensions and arrangement given are conformable to the best and most recent practice. The heating surface is sufficient for all purposes, and the blast area is large enough to avoid loss of pressure by friction, and to insure that the air will remain long enough in the ovens to be thoroughly heated.

Fire grates are provided to one-half of the ovens, in case it should be necessary at any time to use coal for fuel, through failure of combustibility of the waste gases. The size of fire grate required may be approximately found as follows, 495·67 pounds of air per minute, are required to be heated from 60° F. to 1,000° F. This requires $495\cdot67\times\cdot238\times940°=110,891$ British thermal units. Each pound of coal burned generates, say 13,500 thermal units, and if the ovens have an efficiency of 50 per cent., half of this, or 6,750 units will be utilized. The coal required then, is $110,891\div6,750=16.43$ pounds per minute, or 985·8 pounds per hour. The chimney draught will be sufficient to burn 15 pounds per square foot of grate surface per hour, and the latter will therefore need to be about 66 square feet. Grates 4 feet wide, by 6 feet long are therefore provided in three of the ovens of each furnace.

TO BE CONTINUED.

MINING NOTES FROM ALABAMA, ARIZONA, AND CALIFORNIA.

ALABAMA.—*The Eureka Iron Mining and Manufacturing Company's Furnace*, situated at Oxmoor, is running day and night, making about 30 tons of pig iron every twenty-four hours, which find a ready market at remunerative prices. The new furnace, now being built, will have a capacity of fifty tons, making eighty tons of iron daily. All the machinery used is of the latest improved kind, and the heat from the coke ovens is utilized to redden the blast furnace, and generate steam that propels the machinery, nothing being allowed to go to waste. The company employs two hundred and fifty persons, most of whom have families, so that we may safely say that fully one thousand persons are clothed and fed by this enterprise. A portion of the employed are at the company's coal mines, near Helena, ten miles further south, also on the line of the South and North Railroad. The ore is conveyed by a railroad, constructed by the company, to the Red Mountain, two miles from the furnace, and costs, delivered, about ninety cents per ton, the whole cost of converting it into pig iron being, so far as we can estimate, not more than the cost of the ore in its crude state in Ohio and other portions of the West. The iron made at Oxmoor sells at from $18 to $20 per ton.—*Jefferson Independent.*

ARIZONA.—*The Hockberry Silver Mine* is in the Hockberry district, Peacock range of mountains, Mohave County, distant about 35 miles east of Mineral Park. It was located in October, 1874. Upon the mine there are five shafts sunk at different depths. All the drifts run and shafts sunk, go to prove that the body is a continuous one. The width of the veins runs from 14 to 16 feet. Ore is only being extracted from the richest strata, and it is worked at not more than 50 per cent. of its assay value. The mill has crushed some 424 tons, which produced $57,366 23, being an average production of over $135 per ton. Wood can be obtained in any desired quantities at $5.50 per cord the year round, and there is sufficient water for a milling capacity of 100 stamps. The Thirty-fifth Parallel Railroad will run through the district, which will bring it within a few days' travel of this city. There are several other locations showing well, but the Hockberry possesses the only mill which is a 5-stamp one, and were there more milling facilities many other properties could be opened out which would yield profitably.—San Francisco *Stock Report*, Sept. 22.

CALIFORNIA.—*The Pennsylvania Cañon Mine* is situated in Alpine County, in a cañon bearing the same name. This was originally a location of 2,000 feet on the lode, but now embraces additional ground by an extension, also a parallel lode. In former times this mine was extensively worked, but of late years it has suffered the fate of many others near it, in having a resting spell of five or six years. The amount of labor heretofore expended upon the property consists of a surface tunnel, driven along and with the lode for a distance of 500 or 600 feet, with cross-cuts at right angles cutting the lode at different places. The ore discovered at these points, while not rich, was of sufficient quality for encouragement that at a greater depth an improvement would ensue, and from the massive proportions of the lode it would prove a mine that would practically be inexhaustible. The appearance of the lode on the surface, and where penetrated by these cross-cuts, proved its identity as a true fissure vein, and measures were immediately inaugurated to commence a tunnel to be driven from near the cañon level, which, when completed, would cut the lode at a depth of 500 feet or more. The tunnel was driven until the total length had reached a horizontal distance of nearly or quite 1,900 feet, and the lode penetrated. So uniform in its general dip was the lode, that the actual distance of the tunnel driven fell short but nine feet, when compared with the estimated distance by survey before the commencement of the lower tunnel, the lode at this point bearing well with its general features in the upper workings. The ore obtained was found to be quite uniform and evenly disseminated throughout the lode from wall to wall. This ore is an admixture of the ruby and black sulphuret of silver in nearly equal proportions, and while of comparatively low grade will amply repay the labor of extraction and reduction when treated by an economical process that will desulphurize the ore. This, formerly, was a very prominent mine.—*Mining and Scientific Press*, Sept. 16th.

The Silver Sprout Gold and Silver Mine is located in the Sierra Nevadas, in Inyo County, at an altitude of about 10,500 feet. The work done upon this mine consists of a tunnel run upon the most depressed portion of the accessible part of the mountain, and is run in a distance of 200 feet, striking the ledge at a depth of 117 feet, and at this point the ledge is 14¼ feet in width, bearing quartz which assays from $130 to $1,496. Several shafts have been sunk, to connect with the tunnel, and directly upon ore for the whole distance, and as depth is attained the ore has steadily increased in value. The ore predominates in silver, but carries, on an average, about one-seventh in gold. At present the company is involved in some litigation, which will soon be terminated, when a sufficient amount of capital will be put up for successful prosecution of the work upon the mine.

The Kearsarge Gold and Silver Mine, situated at an altitude of 9,000 feet, and about one mile east of the Silver Sprout, was located in 1865. Some two years ago the mine passed into the hands of parties who are now bending their whole energies to a successful prosecution of the work of development. There were formerly two sets of workings, the first run into the mountain some 500 feet above and called the Cliff mine. Ore taken from the upper workings was taken to Virginia City, where it milled some $1,800 per ton. It was supposed the ore had given out at this point, and the lower tunnel was started 500 feet below. This tunnel is run in nearly 300 feet, and a shaft has been sunk in the tunnel about 100 feet, upon the ledge, the size of vein and quality of ore gradually increasing as depth was reached since the winze was started. The ore body at the bottom of this shaft is, by actual measurement, three feet, of solid, high-grade milling ore, entirely free from the antimony and refractory ores encountered above, and which will mill at least $300 per ton. It is silver ore, but like the Silver Sprout, carries gold.

The Rex Montis Mines, consisting of five and located on the north side of the same mountain, in an opposite direction from the Silver Sprout mines, and at a higher altitude, being about 11,000 feet. The company at present are working but two of the mines. A drift directly in upon the lead of the Rex Montis, some seventy-five feet, discloses a ledge of three-and-a-half feet in width, between walls some four-and-a-half fee apart. The ore is all good milling, but there is a vein of one foot in width which assays from $1,000 to $2,200. This is at a depth of fifty feet from the surface, and as the ore has gradually increased in quantity and value, and the ledge being wedge-shaped, there is every reason to believe that a large and valuable body will be encountered at no great depth.—Coso *Mining News.*

NOTE FOR MACHINE SHOPS.—So many new wells are starting in the Pennsylvania Oil Regions, that the hardware and machinery men, as well as the rig builders, are unable to fill their orders near as fast as they are wanted.

PENNSYLVANIA TRANSPORTATION COMPANY.—The construction of this company's proposed pipe line to the seaboard cities, will probably be delayed by legal proceedings. The Pennsylvania Railroad Company has applied to the Attorney General of the State, for proceedings in the nature of a *quo warranto*, to test the authority for the construction of the new line.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Sept. 30.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co.	60,668	1,362,389	52,619	2,341,155
D. L. and W. RR. Co.	61,805	1,180,431	52,646	2,313,339
Penn. Coal Co	29,123	734,954	29,035	1,009,108
L. V. RR. Co.	21,982	693,529	21,341	703,631
P. and N. Y. RR. Co	—	17,488	989	79,292
C. RR. of N. J.	50,446	922,318	42,505	928,538
Penn. Canal	9,143	288,882	12,640	199,875
	233,167	5,199,991	211,775	7,575,958
Lehigh Region.				
L. V. RR. Co.	75,626	1,839,639	92,112	1,285,402
C. RR. of N. J.	49,221	967,545	30,343	417,652
D. H. and W. B. RR.	1,345	31,702	2,561	58,067
	126,192	2,838,886	125,016	1,761,121
Schuylkill Region.				
P. and R. R. RR. Co.	158 934	3,168,698	176,534	3,087,155
Shamokin & Lykens Va.	32,405	617,902	25,331	912,515
	191,309	3,786,600	201,865	3,999,670
Sullivan Region.				
Sul. and Erie RR. Co.	—	27,663	—	5,557
Total	550,668	11,853,140	538,656	13,342,306
Increase	12,012	—	—	—
Decrease	—	1,489,166	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

Perth Amboy business:

	Tons.
Received for the week	21,641
Shipped for the week	22,556
On hand Sept. 30	72,690

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 447,604 tons, as compared with the corresponding period in 1875.

Belvidere Delaware RR. report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	6,388	194,505	113,130
" " " South Amboy	12,634	321,621	171,686
Shipments at Coal Port (Trenton).	8,457	193,606	108,343
" South Amboy	13,367	349,393	226,691

Receipts of Coal at Boston, for the week ending Sept. 29, and years from Sept. 1, 1875 and 1876.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	..	2,760	16,357
Philadelphia	12,803	40,179	103,374
Baltimore	300	10,593	22,400
Other places	3,970	18,982	43,837
Great Britain	347	..	604
Nova Scotia	1,037	4,370	5,136

The Production of Bituminous Coal for the week ending Sept. 30, was as follows:

Tons of 2,000 lb., except where otherwise designated.

	Week, Tons.	Year, Tons.
Cumberland Region, Md.		
Tons of 2,240 lb.	36,225	1,314,832
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	6,440	247,674
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	2,800	116,338
*East Broad Top	371	50,663
Clearfield Region, Pa.		
*Snow Shoe	944	38,404
*Tyrone and Clearfield	19,092	843,866
Allegheny Region, Pa.		
*Pennsylvania RR.	3,676	152,426
Pittsburgh Region, Pa.		
*West Penn. RR	3,926	146,801
*Southwest Penn. RR	1,000	42,471
*Penn. & Westmoreland gas coal, Pa. RR.	18,505	593,959
*Pennsylvania RR.	9,376	206,471

* For the week ending Sept. 21.

The Production of Coke for the week ending Sept. 21.

Tons of 2000 lb.	Week.	Year.
West Penn. RR	1,103	34,459
Southwest Penn. RR	9,108	373,185
Penn. & Westmoreland Region, Penn. RR.	1,069	38,169
Pittsburgh, Penn. RR	1,490	119,107
Total	12,770	564,920

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Oct. 6, 1876.

Anthracite.

OCTOBER circulars have been issued, and, as a rule, prices show a slight advance; but, as there has been a slight decrease in the demand for coal, full circular rates are not, in all cases, obtained. The large quantity of coal being delivered on account of auction and other late sales, gives the market quite an animated appearance, and there is a pretty active demand from dealers and consumers of coal who are compelled to lay in supplies before the close of navigation. The prices secured, are, upon the whole, unprofitable to shippers, and till the stimulating effect of these low prices has had time to permeate the whole business of the East, and produce its natural result of increased consumption, there is no prospect of much higher prices, and, possibly, scarcely

a maintenance of present rates. There are many buyers who anticipate being able to procure coal as they may require it during the Winter, at prices possibly even less than those of to-day.

The tendency is decidedly toward over-production, and in the face of anticipated large accumulations of stocks, prices can never be maintained. While we do not anticipate any notable increase in prices, we do not expect to see any material decline from the unremunerative rates now ruling.

The late reduction of freights on Clearfield coal, to be shipped from Philadelphia to points East, accompanied with a reduction of wages, which has just been submitted to by the miners, again enables this coal to compete with the Schuylkill anthracite, and to distance Cumberland, where the insane policy of the Consolidation Coal Company has succeeded, or will soon succeed, in closing most of the mines.

The production of coal last week was 550,668 tons, or 51 147 tons more than the previous week, while for the corresponding week of 1875 the production was but 538,656 tons, or 12,012 tons less than last week. The total production since January 1, shows a falling off, as compared with the like period of last year, of 1,489,166 tons. If the rate of production that prevailed last week, including coal consumed at mines, were maintained throughout the entire year, there would be mined 30,000,000 tons or about 50 per cent. more than was mined last year. Although last week's production was large, it was very much curtailed by interruptions in the coal traffic of some of the roads which carry passengers to the Centennial. The following companies show a decreased production, as compared with 1875, as follows: Delaware & Hudson Canal Company, 42 per cent.; Delaware, Lackawanna & Western Railroad Company, 49 per cent.; and Pennsylvania Coal Company, 27 per cent. The following companies show an increased production as compared with 1875, as follows: Lehigh Valley Railroad, 24 per cent.; New Jersey Central Railroad, 40 per cent.; and Philadelphia and Reading Railroad, 2¼ per cent. The three latter roads had production seriously interrupted by a strike during the first six months of 1875.

OFFICE OF THE PA. & N. Y. R.R. CO.,
BETHLEHEM, Oct. 1st, 1876.

On and after this date the rate on coal for Buffalo, for Watkins, Ithaca, and Weedsport, for water shipment; Auburn, for New York Central Railroad; Sterling, for Lake Ontario Shore Railroad, and Fair Haven will be $1.03 per gross ton, between Coxton and Waverly. On coal for Rochester, via Erie Railway, Salamanca and points west thereof, an additional charge of 10 cents per ton will be made to cover transshipment charges at Waverly.

ROBERT H. SAYRE, President.

Bituminous.

Our latest returns from the Clearfield Region show that the production of that field had decreased to nearly three-fourths of what it was before the anthracite combination broke. The Pennsylvania Railroad, the coal companies, and the miners, realizing this great loss of trade, have taken prompt measures to regain it; the railroad company by making a reduction of 25 cents per ton on freights on coal to be shipped from Philadelphia (there is no reduction on coal to be shipped from Amboy); the coal companies by insisting on a reduction of wages, and the miners by submitting to it with hardly any resistance. In total, the cost of putting coal on board at Philadelphia has been reduced 35 to 40 cents per ton, and as coal was sold previous to this reduction at prices ranging from $3.50@$3 75, we may look for very low prices if the competition necessitates the concessions. At the prices at which this coal is now being offered, there should be a large quantity sold for manufacturing purposes.

The Cumberland production last week shows a decrease of 18,949 tons as compared with the corresponding week of 1875. The total decrease since January 1st, as compared with last year, is 447,604 tons. This difference must increase from week to week, and, as already stated, the maintenance of the present policy of war-priced mining labor and extortionate tolls on the local road will shortly succeed, as probably it is designed to do, in closing nearly all the mines in this field.

In reviewing the wages paid in this region, we find that wherever any changes have been made since 1867, they have been in the way of an advance, and that the wages then and since paid will average more than one hundred per cent. higher than those paid in any year from 1855 to 1862. At the same time, the freight rates of three, four, and five cents per mile imposed by the local railroad, are so extravagant in comparison with those paid in competing fields, as to be practically prohibitive to this trade. Self-interest must in time provide a remedy for these abuses, but if the evils that attend a crippled industry are to be averted, the operators, miners, and carriers of this region would do well to lose no time in following the example of their Clearfield rivals. There is a remedy within the reach of the operators of the Cumberland field, which we have already pointed out, namely, in providing an outlet to the canal, which will be a common carrier and beyond the temptation of "squeezing out" the operators. It is a matter of surprise that they have not long ago provided this simple and only effective remedy. What they have lost in the past few years for the want of it, would have built and equipped the road to which we allude, and their losses from this cause will probably be still heavier in the future, for some of the companies may lose their whole property. This policy of strangulation of a coal field may be quite as effective, while carried on slowly under such tolls as simply absorb all the profits, as under the more violent prohibitive policy which is now in force. True, those who have not spirit enough to help themselves, scarcely deserve much sympathy, but, it is for the large interests which suffer by the destruction of an important industry that we raise our voice.

In our advertising columns will be found an announcement of the formation of a "General Coal Agency of the Chesapeake and Ohio Railroad Company," with Mr. A. S. HATCH, of the well known firm of FISK & HATCH, bankers, of this city, as General Manager. It is not the intention of the railroad company to enter into selling coal for the purpose of making a profit on the coal, but to make a strong and decided effort to introduce the superior fuels that are mined upon the line of its road, with the object of increasing its tonnage. The producers of coal on this road have not, as a rule, mined large quantities, and having but little coal to offer, have not given the market the thorough canvassing necessary to create a large demand. Mr. HATCH hopes, by having large quantities of coal to dispose of, to be able to thoroughly systematize the mode of introducing it, thereby increasing the sales, and at the same time decreasing the cost of marketing it. The coals Mr. HATCH is offering are well worthy of attention, and will, undoubtedly, soon become prominent for gas, steam, and domestic purposes. The Cannelton splint coal, which has been offered by MESSRS. PERKINS & JOB, of this city, during the last month, has already attracted considerable attention, and is a favorite with those who have used it. There is no doubt that it will, eventually, largely, if not totally, replace all foreign coals for domestic purposes, while many who have heretofore used anthracite in open grates will now use this. The Kanawha splint coal is destined to be in large export demand at some future day, there being no other bituminous coal mined in this country that will so well stand transportation and storage. It is hard and makes very little waste, and is not at all subject to spontaneous combustion. Although Mr. HATCH will offer all the coals mined on the Chesapeake and Ohio Railroad, yet some of the companies will continue their regular agents, who will also offer their coal at the same prices as Mr. HATCH.

Wholesale Prices of Anthracite Coal for Oct., f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Rondout	3 25	3 30	3 40	3 50	4 25	3 75
Pittston at Newburg	3 10	3 10	3 25	3 35	4 10	3 60
Wilkesbarre at Port Johnston	3 25	3 25	3 50	3 50	4 25	3 50
Plymouth, R. A.	....	....	3 50	3 50	4 30	3 50
Susque. Coal Co. at Amboy W.A.	3 25	3 25	3 50	3 50	4 00	3 30
Kingston at Hoboken	3 25	3 25	3 40	3 50	4 25	3 50
Lehigh Coals.						
Old Company at Port Johnston	4 00	....	3 60	3 60	4 00	3 30
Old Company's Room Run "	4 00	....	3 60	3 60	4 00	3 30
Sugar Loaf, Hobok. & Amb. "	4 00	....	3 60	3 60	4 00	3 30
Lehigh Coal Exchange "	4 00	....	3 60	3 60	4 00	3 30
Honey Brook Lehigh	4 00	....	3 60	3 60	4 00	3 30
Beaver Meadow at South Amboy	4 00	....	3 60	3 60	4 00	3 30
Schuylkill Coals at Philadelphia.						
Schuylkill white ash	3 20	3 20	3 20	3 20	3 70	3 20
Schuylkill red ash	....	....	....	3 30	3 80	3 20
Lorberry	....	....	4 20	4 20	4 20	3 25
Lykens Valley	....	....	4 70	4 70	4 70	3 70
North Franklin red ash	....	....	4 20	4 20	4 20	3 25

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	4 c.
" " Elizabethport & Port Johnston to N. York	4 c
" " South Amboy to New York	4 c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" " South Amboy	8 50	....
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 75
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	5 50	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va	3 50@3 75 — 4 90
Cumberland, at Baltimore	3 65@3 80 — 5 10
Clearfield f.o.b. Canton, Baltimore	3 75@.... — 5 25

Rockhill Semi-Bituminous and Broad Top, at the mine, per 2,000 lb., 95, f. o. b. Greenwich, Philadelphia, per 2240 lb., $3 60@3 95, according to destination; at South Amboy, N.J., 4 60; New York, 5 00.

Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 95; at Greenwich, Phil., per 2240 lb., 3 50@4 25, according to destination; f.o.b. South Amboy, N. J., 4 75; New York, 5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove. Chestnut.
Pittston coal, in yard	$4 20	$4 50 — $3 80
Lackawanna coal, in yard	4 20	4 50 — 3 80
Wilkes-Barre, delivered	5 00	5 30 — 4 60
Lehigh & Locust Mountain, del'd	5 50	5 50 — 5 00
Schuylkill Red Ash, del'd	6 00	6 00 — 5 50

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " "	22 00
American " " "	13 00
Cannelton splint, " " "	10 00
Cannelton Block, " " "	10 00
American Orrel " " "	11@14
Red Bank Cannel " " "	10 00
Cumberland " " "	7 00

Baltimore, Md. Oct. 2, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$3 85	$3 55
Broken	3 85	3 55
Egg	3 85	3 55
Stove	4 35	4 05
Nut	3 85	3 55
Shamokin. (red or white ash), and "Boston," free burning white ash,		
Egg	4 10	3 80
Stove	4 35	4 05
Lykens Valley, red ash,		
Egg and stove	5 35	5 05

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2240 lb. ..... $5 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston. Sept. 30, 1876.

THE two auctions of the week have been a theme of interest and their results somewhat of a surprise to many. The prices obtained were within about 30c. of what the circular combination rates would have been, while the position of freights makes the cost very close to those suggestive quotations. The sales were full of spirit and the purchasers not all supplied. Wednesday's sale was occupied about thirty minutes and Thursday's just about half that time. About 3,500 tons only comes to the Boston market, although about 40,000 tons will come to New England.

The demand for freights is far in excess of the supply, the late storms having detained the coal fleet in making destinations. During the week Boston charters have been made at $1 50 from New York; $2@2 10 from Philadelphia; $1 45@1 50 from Baltimore, and $1 60 from Georgetown.—*Commercial Bulletin.*

Buffalo, N. Y. Oct. 1, 1876.

Reported by LEE & LOOMIS.

Deliv'red at	Elmira.	Ithaca.	Syracuse	Rochester.		Oswego
	Afloat.	Afloat.	Afloat.	afloat	ret. del.	f.o.b.
Grate	$3 80	$3 05	$3 20	$3 90	$5 15	$4 15
Egg	3 80	3 15	3 30	4 00	5 25	4 25
Stove	4 20	3 65	3 80	4 50	5 75	4 75
Nut	3 95	3 40	3 55	4 25	5 50	4 50

Delivered at	Erie.	Buffalo.			
	f.o.b.	Afloat.	f.o.b.	ret.	del.
Grate	$4 65	$4 15	$4 65		$5 40
Egg	4 75	4 25	4 75		5 50
Stove	5 25	4 75	5 25		6 00
Nut	5 00	4 50	5 00		5 75

Chicago, Ill. Oct. 2, 1876.

Lackawanna Stove	$7 50
" Chestnut	7 25
" Grate and Egg	7 00
Erie and Brier Hill	5 50
Wilmington and Illinois	4 75@ 4 25
Blossburgh	7 00

Cincinnati, O. Oct. 2, 1876.

Reported by our Special Correspondent.

	Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat		@6½c.	—
Pomeroy coal	"	@5c.	—
Kanawha "	"	7 c.	—
Cannel coal, according to quality	"	11 @16c.	—

The following are the retail prices delivered

Youghiogheny	8c. —
Pomeroy	8c. —
Cannel	14@20c. —
Kanawha	10c. —
Anthracite, per ton	10 50
Coke, at yard	7c. —
Coke, hard and soft, delivered	—@10c. —

Cleveland, O. Oct. 2, 1876.

Specially reported by Messrs. LAMBIE & BATES.

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	For vessels,	On cars.
Youghiogheny Gas Coal	$4 10	$4 00
Cannel	4 25	4 15
Blossburgh	$5 00	$5 00
Briar Hill, Block Coal	3 50	3 25
Straitsville Coal Co., lower vein	2 90	2 90
" " whole "	2 80	2 80
Hocking Valley	2 90	2 90
Massillon	2 90	3 00
Tuscarawas Valley	2 50	2 50
Columbiana	2 50	2 50

CLEVELAND COAL EXCHANGE PRICES UNTIL FURTHER NOTICE.

	1 to 10 tons.	10 tons upw'd
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 75
" " " " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, lp.	3 60	3 35
" " " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 60	3 35
" " nut	3 25	3 00
Maple Hill lump	3 50	3 25
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a, Wilkesbarre and Pittston egg and grate	6 75	6 05
" " stove	6 75	6 50
" " chestnut	6 50	6 25

Lehigh to be $1 25 per ton higher.
All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Oct. 2, 1876.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 50	Peytona cannel, per ton.	5 75
Brazil Block, "	2 50	Indiana Cannel	4 50
Highland, grate, "	2 25	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	1c

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 35	Nut	8 50
Egg	8 35	Stove	8 75

Lehigh Anthracite.

Broken	9 75	Nut	9 50
Egg	9 75	Stove	10 00

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8
White River	13	" Slack, "	7
Brazil Block	14	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	20
Highland Nut, " "	12	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$9 75 per ton.
Lehigh, retail	$11 50 per ton,

Louisville, Ky. Oct. 2, 1876.

Specially reported by Messrs. BYRNE & SPEED.

There is a large supply of coal here. The wholesale sales are light, taking into consideration the low prices. The retail demand is good.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburg	6½c.	Pine Hill	—
Raymond City	6½c.	Kentucky	7c.

RETAIL.

	per bushel		per bushel
Pittsburgh	10c.	Peytona Cannel	18c.
Raymond City	10c.	Buckeye "	
Pine Hill	13c.	City-made Coke	8c.
Kentucky	9c.	Anth., per ton, $10 00 to 10 50	

Screened Pittsburgh per load $3 50
Screened Raymond City 2 50
Pine Hill (Kentucky) 2 25
Cannel 4 50
City-made Coke 4 00

Milwaukee, Wis. Oct. 2, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Trade is quiet. Our prices for coal are:

Retail price per ton of 2000 lb.

Lehigh Lump	$ 9 00	Briar Hill, select	$7 00
Lehigh Prepared	9 50	Blossburgh	7 00
Lackawanna (all sizes)	8 50	Cannel	8 00
Pittston	8 50	Pittsburgh	6 50
Scranton	8 50	Steam coal	5 50

New Orleans, La. Oct. 1, 1876.

Reported by C. A. MILTENBERGER & Co.

Pittsburg coal, retail, per bbl	50c.
" wholesale	30c.
" steamboats, per box	40c.
" to manufacturers	45c.
" shipments, per hhd	$5 50
Anthracite, wholesale, per ton	
" retail, "	12 00
Virginia Cannel, per bbl	80c.
Scotch " "	80c.
Mt. Carbon, wholesale, per bbl	
" " retail, "	50c.
St. Bernard wholesale, per bbl	30c.
" retail, "	45c.

Pittston, Pa. Oct. 2, 1876.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00

Delivered, fifty cents per ton additional.

Richmond, Va. Oct. 2, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Prices are now as follows:

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 00
" semi-Cannel	4 00	Clover Hill Coal	3 50
Coalburgh Splint	4 00	James River Bitum	3 30
Lewiston "	4 00	" " Carbonite,	5 00
Kanawha Gas coal	3 90		

San Francisco, Cal.

From the *Commercial Herald*, Sept. 28, 1876.

Imports from Jan. 1st to Sept. 16:

	tons.		tons.
Anthracite	10,241	Vancouver Island	74,832
Australian	84,755	Rocky Mountain	152
Coos Bay	27,889	Seattle	69,064
Cumberland	9,251	Bellingham Bay	10.395
English	53,126	Chili	2,076
Mt. Diablo	70,860		

The mines in this State and in Washington Territory have had quite a set back of late by reason of low prices prevailing for imported supplies. The product of Bellingham Bay and Coos Bay Mines has been materially reduced, while the Wellington and other mines of Vancouver Island, B. C., have also felt the pressure and been obliged to reduce their working force very materially. For some time past the prices of gas coals has been so very low as to be tempting to the Gas Company to purchase Wallsend and other desirable kinds. Cargoes of Scotch have been recently sold at $7.75, while some new Australian (outside) mines have been sold at $6.50@7 per ton. We have before noted a sale of Wallsend at Portland, Oregon, at $5. These low prices of foreign coals brought here as ballast and paying a duty of 75c. per ton entail a heavy loss upon the shipper, compelling him to look for a high return wheat freight in order to make the round voyage at all profitable. Nanaimo sells at $8. The Seattle mines contracted early with the railroads at $9. The arrivals for the week embrace the following: *Phaeton*, from Sutherland, 850 tons Scotch; *Iron Duke* from Sydney 2,076 tons.

St. Louis. Oct. 2, 1876.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered.

ANTHRACITE.

	per ton.
Lackawanna	$9 00@10 00
Wilkes-Barre	9 00@10 00
Schuylkill	9 00@10 00
Lehigh	11 00@12 00

BITUMINOUS.

Blossburg	9 00
Pittsburg	4 50
Indiana Block	4 00
Big Meadow	3 00
Illinois Coals	2 50@3 00
Connellsville Coke	9 00

Toledo, Ohio. Oct. 1, 1876.

Specially reported by GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75

Soft Coal.

Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Montreal. Oct. 2, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$4 25	Cape Breton Steam	$3 75
Picton "	4 25	Newcastle Smiths	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 25	Chestnut	6 25
Stove	6 75		

Hamilton, Ont. Oct. 2, 1876.

Specially reported by H. BARNARD, Dealer in Coal.

Grate	$5 75
Egg	5 75
Stove	6 00
Nut	5 75
Lehigh Lump	6 50
Smithing	6 00
Bituminous, retail	5 50
" steam	4 00
Coke	6 75

Freights

Representing the latest actual charters up to Oct. 6, 1876.

Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	....	....	....	....
Alexandria	....	....	....	....
Amesbury, Mass	....	....	....	1 75
Bangor, Me	....	3 25	....	1 50
Bath, Me	....	2 00	2 00	1 50
Baltimore	....	....	....	....
Boston, Mass	1 80@2 00	2 00	2 00	1 50
Bridgeport, Ct	1 05†	1 50	....	80
Bristol, R. I	....	....	....	1 00
Cambridgeport, Mass.	2 00@2 10	....	....	1 50
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	2 00@2 10	....	....	1 50
Fall River	1 50@1 75	1 50	1 65	1 00
Hackensack	....	....	....	....
Hallowell, Me	....	....	....	....
Hartford	1 75@2 00	....	....	1 00
Hoboken	†95	....	1 40	45
Hudson	....	....	1 65	....
Jersey City	†95	....	1 40	45
Lynn, Mass	....	....	....	†1 50
Middletown	1 75@2 00	....	....	1 00
Mystic	....	....	....	....
Newark	†95	....	1 60	....
New Bedford	1 80@2 00	1 50	1 70	1 10
Newburyport	2 00	2 15	2 10	1 65
New Haven	1 05†	1 50	....	70
New London	1 50@1 75	1 50	....	80
Newport	1 50@1 75	....	....	1 00
New York	†95	1 45	1 45	45
Norfolk	....	....	....	75
Norwalk	1 05†	....	....	80
Norwich	1 50@1 75	....	....	90
Pawtucket	1 75	....	....	†1 10
Philadelphia	....	....	....	....
Portland	2 00@2 15	2 00	2 00	1 25
Portsmouth, N. H.	2 00@2 10	2 15	2 10	1 65
Providence	1 50@1 75	1 50	1 65	1 00
Poughkeepsie, N. Y.	1 10†	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	....
Salem, Mass	2 10@2 15	2 00	2 10	1 50
Salisbury Pt., Mass.	....	....	....	....
Stamford	1 05†	....	....	....
Stonington	....	....	....	....
Taunton	....	....	....	....
Troy	1 15†	....	....	....
Warren, R. I	....	....	....	1 00
Wareham	....	....	....	....
Washington	....	....	....	....
Weymouth	....	....	....	....
Wilmington, Del	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Oct. 6, 1876.

American Pig.—The Thomas Iron Company has put in blast its sixth furnace, and is sold ahead for fully six weeks. This is an encouraging feature so far as it goes, but it appears to end here, as we do not get encouraging reports from other sources. There is, however, no doubt that there is a little more business doing than there was a few months ago, but it is also evident that there is an inclination to more than counterbalance this by an increased production. The prices at which iron can now be made are a temptation for such companies as have idle furnaces to put them in blast. There are several furnaces that would be put in immediately did not the owners fear that their action would result in a decline of from one to two dollars per ton in the price of iron. It is very evident that there is to be no early advance in the price of iron, while on the other hand it is not quite safe to predict a further decline, although the chances are rather in its favor. There is now a new feature in the market that has a weakening tendency. The Reading Railroad Company has been carrying since the panic, it is said, about 60,000 tons of iron, and as it has been rumored that the company has had difficulty in meeting its financial engagements, those who are familiar with the situation have an inclination to hold off, anticipating that this iron may be forced upon the market, in which event

much confusion must occur. We continue to quote No. 1 foundry at $22; No. 2, $20; and forge, $19@$20.

Scotch Pig.—There is but very little doing in this article. Stocks are small, and prices nominally unchanged, We quote as follows: Coltness, $28@$29; Eglinton, $26.50@$27.

Rails.—We are unable to learn of further business. The Lackawanna Iron and Coal Company has closed both its iron and steel mills, and there are rumors of additional stoppages. We continue to quote iron rails at $36@$41 at mills, and steel, $52@$54.

Old Rails.—These are very quiet, and quoted at $21, nominal.

Scrap.—We note a sale of 700 tons of wrought on private terms, and quote at $26@$27 from yard.

Philadelphia Iron Trade.

Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Oct. 5, 1876.

THE month comes in with a brisk demand for pig, and firmer feelings as to price. The sales for the past week have been large and for immediate delivery, showing that the iron is for consumption, and not speculation. The Thomas Company are blowing in two additional furnaces, making six in blast, and the Crane Company one additional furnace, making four for them. We also hear rumors of several others on the Lehigh, about to blow in. On the Schuylkill the furnaces are all sold up to their make, and one or two sold ahead for six weeks. Prices have not advanced, nor will they, it is thought, as it would put many small furnaces in blast that are now out, and make prices tumble even lower than at present. We report sales of 2,000 tons of Crane at quotations; 1,000 tons of Chickies forge, $22; 50 tons of St. Charles, $22.50; 100 tons of No. 2 Montgomery, at $20. We quote, No. 1 $22 to $22.50; No. 2, $20 to $20.50; Gray Forge, $19 to $19.50; Foundry brands, Gray Forge, $21 to $22.

MANUFACTURED IRON continues in the dull and listless state noticed for some months. We do not hear of one mill having orders on hand for more than a day at a time. We quote 2 2-10c.,@2 3-10c., per lb.

RAILS.—We quote: Iron, $38 to $40; Steel, $54 to $56.

SCRAP.—We quote: Wrought, $24 to $27; Cast, $14 to $19.

Baltimore. Oct. 4, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

We have no change in the iron market, and quote prices as follows:

Baltimore Charcoal	$30@34	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@34	Mottled and White	17@18 00
Anthracite No. 1	24@25	Charcoal C. B. Blooms	63@65 00
" No. 2	22@23	Refined Blooms	50@55 00

Boston. Sept. 30, 1876.

PIG is holding the improved business noticed last very fairly. The irregularity in prices and the miscellaneousness of brands are somewhat confusing, but still the tenor is encouraging, for a fair lot of the stuff that has hung in the market for eighteen months past has found an outlet. There is very little cash business to be had unless prices settle down to the neighborhood of $23.00 for No. 1, and few credit accounts expect even the fanciest brands to rise above that figure. In No. 2 the market covers all sorts of things. Cheap lots of No. 1 are quoted as No. 2, such is the impression of the buyers who are taking rather more so-called 2 than 1.

BAR maintains the characteristics of the week previous. The market is not very well supplied with an assortment, and yet dealers manage to complete their orders by buying of one another. This lends firmness to quotations, and certainly gives buyers more confidence that their purchases are at the bottom figures. We still quote $49 as the lowest point for merchantable, and $40 for common.—*Commercial Bulletin.*

Chattanooga, Tenn. Oct. 2, 1876.

Specially reported by J. F. JAMES pig iron broker, etc., 233 Market Street.

No change to report in the condition of our market during the past week. Car-wheel iron being so slow of sale that the holders have decided on a slight reduction in prices. Below are corrected current prices on the usual four month's time.

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$20@ 21
" " " " No. 2 foundry	19@ 20
" " " " gray forge	16@ 17
" and Georgia coke, No. 1 foundry	18@ 19
" " " " No. 2 foundry	17@ 18
" " " " gray forge	15@ 16
White and Mottled	14@ 15
Tennessee and Georgia cold-blast car wheel	21@ 22
Alabama " "	21@ 22
Old Rails	cash 20 50
Cast Scrap	" 13
Wrought Scrap	" 18@ —

Cincinnati, Oct. 2, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

The demand is fair, and prices are firm at quotations.

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00—4 mos
" No 2, "	23 00@ —4 mos
" Mill	20 00@ —4 mos
Tennessee, No. 1, Foundry	23 00@ —4 mos
Tennessee, No. 2, "	22 00@ —4 mos
" Mill	20 00@21 00—4 mos
Missouri, No. 1, Foundry	@ —4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 00@22 50—4 mos
" No. 2, "	20 50@21 00—4 mos
Ohio Mill	19 00@20 00—4 mos
Missouri, No. 1 Foundry	25 00@ —4 mos
" No. 2, "	24 00@ —4 mos
" Mill	23 00@ —4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@43 00—4 mos
Tennessee "	25 00@32 00—4 mos
Missouri "	31 00@35 00—4 mos
Alabama "	25 00@32 00—4 mos

BLOOMS.

Charcoal	60 00@ 75 00—cash

SCRAP IRON.

Cast	50c.@ 85—cash
Wrought	1 00@1 40—cash

Louisville. Oct. 3, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is without change in tone or price.

The usual time, four months, allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$23 00@25 00
No. 2 " " " "	21 00@22 00
No. 1, Mill, from " " "	19 00@20 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	21 00@22 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	20 00@21 00
No. 1, Mill, from " " " "	19 00@20 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	21 00@23 00
No. 2, " " " "	20 00@21 00
No. 1, Mill, " " "	19 00@20 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	20 00@22 00
No. 2, " " " "	19 00@20 00
No. 1, Mill, " " "	18 00@19 00
No. 1 Foundry, from Missouri Ores	—— @ ——
No. 2 " " "	—— @ ——
No. 1 Mill, from Missouri Ores	23 00@24 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@43 00
" " Tennessee "	25 00@30 00
" " Alabama and Georgia Ores	28 00@40 00
" " Kentucky Ores	28 00@42 00

San Francisco, Cal.

From the *Commercial Herald*, Sept. 28, 1876.

The stock of pig iron, both American and English, is large, and prices even of No. 1 Scotch and all other sorts more or less nominal—say $30. Tin plate is in large stock. We quote I. C. Coke $7.50: I. C. Charcoal, $8.50 @9; I. X. ditto, $10.50@$11. The ship *General McClellan* for New York carried 416 tons pig lead, 7,164 pigs.

Montreal. Sept. 26, 1876.

We continue to quote: Pig iron, Eglinton and Clyde; $17.50@18.00; Carnbroe $18.00@18.50; American $19 @20; Summerlee and Calder $18.50@19.00; Langloan and Gartsherrie $19,50@20.00; Coltness $22.50@21.00; Hematite, $30@31. Bar, per 100 lb., Scotch and Staffordshire, $2.00@2.10; best do., $2.25@2.35. Swedes and Norway, $4.75@5.50; Low Moor and Bowling, $6@7.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Oct. 6, 1876.

THERE has been very little business done during the week, and but few features of interest in the market.

Gold Coin.—During the week under review, the price of gold has ranged from 110¼ to 109¼, and closed at 109⅜.

Bullion.—Silver shows a decline as compared with a week ago. The quotation here is 113¼@114, and in London, 52d., while in San Francisco the price has advanced to 9 per cent. discount. Gold remains unchanged at par to ¼ per cent. discount.

Copper.—About 300,000 lb. of spot copper are reported to have been sold at 20¾c.@21c., while there is a rumor that 1,250,000 lb. have been sold at 21c. for future delivery including January. The market is very firm, and there is no doubt that the statistical position at the end of the year will be much more favorable than for several years past. At the present time manufacturers are only buying from hand-to-mouth, although their wants appear to be greater than they were a few months ago. This market closes strong at 21c. The London market, according to cable advices of September 30th, quoted Chili Bars at £72 10/; and Best Selected at £78 10/@£79.

Tin.—Straits in London is quoted at £72. There is very little business doing in this market. Prices in gold, are as follows: L. & F. 17¼c.; Refined, 17c.; L. & F. 16½c. @16¾c.; and Banca 19c.

Tin Plates.—The business doing is only in a small way at prices not so firm as have been ruling. We quote as follows, in gold, per box: Charcoal tins $7@7 25, and ternes; $6.37½@$6.50; coke tins, $6@$6.12½, and ternes, $5.62½@$5.75.

Lead.—There has been but very little business done during the week. Prices are somewhat demoralized and are quoted at 6·15c.@6·25c. gold, for ordinary domestic in this market, while Missouri soft has declined to 6¼c. currency in St. Louis, with liberal quantities offered at that figure.

Spelter and Zinc.—Domestic spelter is very quiet, nd is quoted at 6¾c. currency. Sheet zinc is neglecte at 8¾c. currency, for domestic.

Antimony is in but limited demand at 14¾c.@15c. gold.

Quicksilver is quoted at 44c.@45c. gold, per lb. in San Francisco; £8 per flask in London, and 47c.@48c. per lb. in this city.

The San Francisco *Commercial Herald*, of Sept. 28th says of Quicksilver: "In response to a request made by us a few weeks since, the Colusa *Sun* states the production of the Abbott Quicksilver Mine as follows: From May 19, 1875, to January 1, 1876, 628 flasks; from January 1st to July 1st, 1876, 821 flasks, during which period the furnace was shut down forty days at one time; from July 1st to September 1st, 416 flasks. The *Edward May*, for Hongkong, carried 100 flasks. Overland shipments East in August were 800 flasks. The present supply equals the demand, causing steady prices —say 44c@45c.—with sales at the inside rate for export.

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Oct. 6, 1876.

THE coal shares have again been the prominent feature in the New York Stock Market, the transactions being the largest we have ever recorded, amounting to 736,244 shares against 226,320 shares as sold during the previous week. The fluctuations have been very marked and irregular, and no doubt the great bulk of the transactions, and the movements in these are purely speculative. We note differences amounting to nearly 17¼ per cent. between the extreme prices. As an evidence of the extreme speculative movement in these stocks we mention that the carrying rate has been as high as 1 per cent. per day.

New Jersey Central Railroad.—154,272 shares of this stock have changed hands, between 23¾ and 40¼, closing at 38¼. This stock exhibits the largest advance of any on the list, and various rumors are in existence to account for the same, none of which are verified however. For some time past there have been some heavy purchases, in a quiet way, of New Jersey Central, and the effect of the withdrawal of this stock from the market was seen on Wednesday, when the bears started to cover, in consequence of more favorable reports about the company than of late. The resignation of JOHN TAYLOR JOHNSTON, and the election of EDWARD C. KNIGHT, of Philadelphia, to the position of President of this company, was announced yesterday.

Delaware, Lackawanna and Western Railroad Company.—Over 550,000 shares of this stock is reported as having been sold during the past week, between 64½ and 73¾, closing at 71¾. The company are still changing their coal cars to conform to the narrow gauge at the rate of fifty per day. Over six thousand have already been altered.

Delaware and Hudson Canal Company.—The extreme quotations in this stock are represented by 61¼@69¾, closing at 68, with sales amounting to some 12,000 shares. We note in the London *Mining Journal* of the 16th ult., that "The Scottish American Investment Company announce the issue of 1,000 10 per cent. 1st Consolidated Mortgage bonds of $1,000 each of the Susquehanna and Albany Railroad Company, principal and interest guaranteed by the Delaware and Hudson Canal Company." It is strange that a company that made so favorable a showing a few weeks ago should thus have been in the market for a loan of $1,000,000 at *ten per cent.*

Mariposa Land and Mining Company has sold to the extent of 1,000 shares, between 3½ and 4⅝. The trustees of this company have levied an assessment of $1 per share on the preferred and common stock, payable at their office on or before October 9. After that date it will be delinquent, and liable to a charge of $3 each certificate, for advertising sale.

Chesapeake and Ohio Railroad.—General WICKHAM, the Receiver, notifies the employees of the company, that after the 1st of October their pay will be reduced 10 per cent, on account of the depression in business.

Nashville, Chattanooga and St. Louis Railroad.—The stockholders of this road at a recent meeting voted unanimously to approve the contract made by the directors with the Southern States Coal, Iron, and Land Company of England for an extension of the Jasper Branch into the Sequatchie Valley.

Chicago and Alton Railroad.—The Chicago and Alton Railroad Company has purchased the Chicago and Wilmington Coal Company's track, and will soon begin operations to open a connecting line from Braidwood, Ill., to Coal City.

Chesapeake and Ohio Canal.—The Maryland loan coupons on the bonds of this company are payable this month in the city of Baltimore.

The Abbott Iron Company's stockholders held their annual meeting at Canton, Md., last week. The rolling mills of this company are now in operation, employing about 220 workmen. One puddling furnace and two plate iron mills are worked, turning out large quantities of plate iron for boilers, smoke stacks, etc. The force of men now employed is much larger than in Summer. The mill where iron rails were formerly made and the puddling furnace attached have not been worked since last Spring.

Spring Hill and Parrsboro' Railroad.—The work of laying the track of this road is soon to be begun. The road will be about 25 miles long from the Intercolonial at Spring Hill, N. S., south-east to Parrsboro' on the Basin of Minas. It is intended to serve a coal region of considerable extent.

Moingona Coal Company.—This company paid a quarterly dividend in Boston on the 2d inst. of 3 per cent., equal to $9,156.

National Tube Works Company.—This company paid a quarterly dividend of 2½ per cent. on the 5th inst. aggregating a disbursement of $25,000.

Quotations and Sales of Stocks and Bonds.

For the week ending Oct. 6, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	210	—
Consolidation Coal Co	32	30½	35	66
Spring Mt. Coal Co	—	—	*55	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	10	—
Del., Lack., and West. RR. Co.	74⅛	64½	71⅝	550,360
New Jersey Central RR. Co.	38⅝	23¾	38¼	154,272
Delaware and Hudson Canal Co.	69¾	61¼	68	30,376
Quicksilver Mining Co. pref'd.	19	17	17	100
" " " Common.	14	13	13	70
Mariposa Land & Min. Co. pref'd.	4⅛	3½	4½	1,000
St. Louis & Iron Mountain RR.	—	—	15½	—
Total Shares sold				736,244
Sales for the week previous				226,320
Increase				509,924

* Nominal.

BONDS.

		Inter'st	Sales.	Price.
Del., Lack. & West.	2d M.	M. & S.		@106
" " "	7's Con'ble	J. & D.		@100
Cent'l RR. of N.J.,	1st M., New	F. & A.	21,000	106¾@107
" " "	1st Cons.		27,000	76½@ 84
" " "	Convert'le	M. & N.	47,000	72½@ 84
Lehigh & W.-B'e, Con. Guar'd.			25,000	55½@ 60
Am. Dock & Imp. Mt. Bonds.		J. & J.	18,000	70 @ 77
Del. & Hud. Can.,	1st M., 1891		1 000	@107½
" " "	1884		9,000	103¾@103½
" " "	1877			@103½
" " "	Coup. 7's, 1894		10,000	@ 95
" " "	Reg'd 7's, 1894			@
St. L. & Iron Mountain,	1st M	F. & A.	3,000	97⅛@ 98
" " "	2d M	M. & N.		@ 75
Chesapeake & Ohio 6's,	1st M.		1,000	@ 25
" "	Ex. Coupon			@ 20
Mariposa Gold Loan con. 7s.				@100⅝
Total sales			$162,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, Oct. 6, 1876.

Prices in this market, have been very irregular and a decided increase is shown in the transactions, the total amounting to nearly 178,000 shares, an increase of 86,000 shares as compared with the previous week, all of the stocks show wide fluctuations; in some instances, we note nearly 12 per cent. between the extreme prices.

Pennsylvania Railroad. Stock has ranged between 45¾ and 48¼ closing ⅛ below the highest price of the week, the sales aggregate 74,000 shares.

This Company is now prosecuting an improvement on the line of their road between New York and Philadelphia, which will make that route between the two great cities of the country one of the most comfortable railways in the land. It consists in the ballasting the whole line of the road, in order to avoid the annoyance of dust. The ballasting has now been completed from East Newark to Hackensack Bridge The stone is screened after it is broken, and laid upon the road bed to the depth of about four inches, and also on either side of the tracks, no dust whatever being created by passing trains. The tracks as far as New Brunswick it is expected will be completed by the 1st of November.

Reading Railroad. 85,000 shares of this stock have been sold declining to 19⅞ equivalent to 39¾ per cent. of their par value. The highest point reached was 31½ and 27½ the final price. The company met its interest on bonded obligations promptly on the 2d inst. paying out:—

On account of interest on bonds	$382,140
" " " rents of leased lines	178,724
" " " sinking fund drawn bonds, under improvement mtg	224,000
" " " Branch Railroad bonds	25,000
" " " Reading C. and I. bonds	119,000
" " " coal land bonds due	156,000
Total of interest and bonds	$1,084,864

Lehigh Valley Railroad.—This stock has been sparingly dealt in, 4,321 shares representing the sales, and 44@49 the extreme prices, the closing figure being ¾ below the highest price of the week.

With regard to the contract made some time ago, with the Erie Railway by which it agreed to lay a third steel rail from Waverly to Buffalo, thus making a narrow-gauge for 170 miles, in consideration of being given the right of way for trains over the section for a term of years. It transpires that the traffic sent by the Lehigh Valley Railroad over the Erie, so far, has amounted to enough to pay for twenty miles of the steel rail. It is thought that in about two years the Lehigh Valley will have used the road to an extent sufficient to reimburse itself for advances in the purchase of the steel rails. The rails will then become entirely the property of the Erie Railway.

Lehigh Coal and Navigation Company.—Stock has been comparatively steady, there being a difference of only 2⅞ between the extreme prices of the week.

Westmoreland Coal Company. We note a recent auction sale of 48 shares of this stock at 77 25 per share. This company has its dividend period during the present month.

The Cambria Iron Company, has its dividend period during the present month.

The Pennsylvania Salt Manufacturing Company, has its dividend period during the present month.

The Nescopec Coal Company has its dividend period during the present month.

Ithaca and Athens and Geneva and Ithaca Railroads. The sale of the Geneva and Ithaca Railroad, purchased by the Lehigh Valley Railroad, has been confirmed by the proper court, and as soon as the necessary reorganization can be effected the payment of the suspended interest on the bonds of both this company and the Ithaca and Athens Railroad Company, sold to the same party at about the same time, will be paid probably on the 1st of November.

Pennsylvania Steel Company.—The annual meeting of the Pennsylvania steel company was held on the 2d inst. The report stated that during the past year, 43,176 tons of steel rails were sold, the profits amounting to $3,154,000. A semi-annual divided of 3 per cent. was declared, payable on and after October 16.

Quotations and Sales of Stocks and Bonds.

For the week ending Oct. 5, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co.	49	44	48¼	4,321
Pennsylvania RR.	48½	45⅞	48⅜	73,927
Reading RR.	31½	19⅞	27	85,121
Lehigh Coal and Nav. Co	32⅞	30	32¾	14,619
Penn. Canal	—		*9	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	*3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co	—	—	*1	—
Cambria Iron Co	—	—	*16	—
Crane Iron Co	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	*68	—
Total shares sold				177,988
Sales for the week previous				91,958
Increase				86,030

* These quotations are nominal.

BONDS.

		Sales.	Price
H. and B. T. RR.	1st mortgage, 7s	—	@107
" " "	2d "	—	@102
" " "	3d " cons	—	@ 38
Lehigh Valley RR. Con. mtg. 6s		12,000	96 @ 99
" " "	7s, 1910	5,000	110½@111
" " "	6s Reg.	—	108½@—
" " "	1st M. 6s coup.	—	@107
Pennsylvania RR.,	1st mtge. 6s	3,000	106½@—
" "	gen. " con. 1910	—	107 @—
" "	gen. " 6s, reg.	—	@108¼
" "	Cons. M. 6s reg.	2,000	@100
Phil. & Reading RR. Con. M. 7s Reg.		2,000	@102½
" "	" G. M. 7s, coup.	8,000	@102
" "	" Gen. M. 7s cou.	3,000	@103
" "	new convertible 7s	19,000	70 @ 82
" "	6s 44-80	1,000	@102
" "	7s '93	—	@102
" "	debenture 6s	5,000	65 @ 69
Phil. & Reading C. & I. Co. Deb. 7s		5,000	@ 70
" "	Tamaqua & Swatara tract.	—	@ 80
Lehigh Coal & Nav. Co., 6s '84		—	@ 99
" " "	RR. 6s, '97	2,200	@100
" " "	Con. M. 7s	—	@ 90
" " "	6s gold loan	3,500	@ 98
" " "	Conv. gold loan	2,000	@102
Penn. Canal, 6s		—	@ 69¾
Penn. and N. Y. Canal, 7s		8,000	109¾@110½
Ches. and Del. Canal, 6s		—	@ 85
Susquehanna Canal, 6s		—	@ 70
Delaware Division Canal, 6s		—	@—
Susquehanna Coal Co. 6s		—	@ 77
Buck. Mount Coal Co. 6s		—	@—
Penn. Gas Coal Co. 6s		—	@—
Honeybrook Coal Co. 7s		—	@—
Total amount of sales		$80,700	

Closing quotations, in the absence of sales, represent the latest prices bid.

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, Oct. 6, 1876.

The American Mining Stock Board commenced calling mining stocks on the 2d inst

There was a large attendance. The president, WILLIAM WARD, delivered an address, in which he said the most sanguine promoters of the enterprise were surprised at the large number of business men who had become identified with the board. The committees had had under consideration 650 applications for membership, and 235 persons had been elected, while there was still a list of names awaiting action. Mr. WARD continued:

"In the matter of placing stocks upon the regular call, more than 200 applications have been made to us, and more than three-fourths of them have been rejected. Our list at present comprises less than fifty companies, a large proportion of them being those whose shares are actively dealt in at the San Francisco Stock Boards, and the remainder representing valuable and productive properties. In due time the better class of petroleum wells, and of copper, coal, iron, and lead mines, will be embraced in our daily call, including the shares of ice companies, gas companies, and others properly coming under the classification of manufacturing corporations." After some statements showing that the financial condition of the Board was encouraging, he added: "In due time reading-rooms and cabinets of minerals will be added as necessary adjuncts of such an institution, and as soon as the arrangements can be perfected, a bureau of mines and manufactures will be organized, through which trustworthy examinations may be made of the more prominent properties represented in our Board."

We give the quotations for each day, and the total sales for the week of the various stocks dealt in. We shall give each week the fullest information of these transactions and supplement it by special correspondence from the different mining regions. The transactions for the first five days' business aggregate over 20,000 shares; reference to the quotations show the course of prices for the week. These quotations are based on currency values, and they range about 10 per cent. above the prices ruling in the San Francisco market to-day where quotations are in gold. It is thought that the Consolidated Virginia Mining Company, owing to the decreased product of the mine for some time past, has not sufficient surplus left to meet the next dividend

We learn since the above was in type, that the Consolidated Virginia Co. has declared a dividend of $2 per share, payable on the 11th inst.

The *Commercial Herald* of San Francisco makes the following observations on this subject:

"The question of the continuation of dividends is being agitated, and this has brought out the chance takers on forward disbursements to stockholders, more with a view, we think, to foreshadow the course of the market than anything else. The present devices to create a market are certainly 'peculiar,' and under these conditions stocks have been turned quite smartly, to the chagrin and discomfort of many an outsider, who thought it a good opportunity to invest. A very noticeable activity has manifested itself in 'wildcats,' at low figures, but in large amounts, running through nearly every session of the three Boards. There is nothing encouraging about the present features of the market for an improvement of prices very soon. Notwithstanding the easy conditions of monetary affairs in this city, the tone of the Mining Stock Market shows a strong tendency toward an evenness never known in mining circles here. The whirlwind manner of doing business seems to have had its edge taken off."

In our Boston stock report will be noted the great advance in Duncan Silver. A few months ago when this stock was selling at 50 and 60 cents a share, we published reports from the mines, stating what was actually found, and giving all the necessary information to guide investors. To-day the stock sells at about $13 a share, an advance of 2,500 per cent. in a few months. This single example shows the value of a well-informed journal, to those who desire to invest in mining securities.

It will be well for those in this market who propose investing in California, Nevada and some other Western mining stocks, to bear in mind that there is no such thing as limited liability or fully paid stock there, but where more money is wanted the stock—whether issued at par or at a discount—is assessed, and if the assessment be not paid the stock is sold to satisfy it. In undeveloped or unproductive mines the investor is, therefore, generally simply purchasing the privilege of being assessed. Some of the shares disposed of here during this first week seem to carry that character.

The following information is from our exchanges of the latest dates, showing the condition of the principal mines, whose stock we quote:

Belcher.—Daily yield, 300 tons. The old ore breasts hold out excellently well, although showing no particular improvement in any direction. The south drift at the 1,500-feet level is driving ahead as usual, and looking well. North and east drifts at the 1,600-feet level advancing steadily, but showing nothing new and interesting to report. Good progress continues to be made in sinking the new air and pump shaft of the Belcher and Crown Point.

California.—Daily yield, 500 tons, coming from the ore breasts and stopes of the 1,500, 1,550 and 1,600-feet levels, all of which continue looking and yielding as finely as could reasonably be wished. Three hundred tons of this ore is hoisted through the C. and C. shaft, and the balance through the Consolidated Virginia shaft. The east crosscut from the main south drift at the 1,600-feet level has been connected with the winze from crosscut No. 5 from the level above. The main south drift at this same level has been extended twenty-six feet during the past week, and is now 122 feet south of crosscut No. 5, the face still continuing in rich ore. The direction of this drift was changed yesterday to a course south 38 degrees east, in order to connect with the California deep winze. The C. and C. shaft is now down 125 feet below the 1,500-feet station. Rock working firm and favorable. The water coming in is all the pumps can manage, running at the rate of ten strokes per minute steadily, each blast of the rock at the bottom of the shaft opening a fresh source of water supply for the pumps to reduce. In fact, it is about an even thing between the pumps and the water, at present. Good progress is made cutting out for the pump and tank pit below the 1,500-feet station. The new mill of the company is working as satisfactorily as could be wished

Consolidated Virginia.—Daily yield, 350 to 400 tons per day, from the 1,400 and 1,550-feet levels, keeping the Brunswick, Trench, and Bacon mills steadily running. All the ore breasts and stopes are looking splendidly, and the east portion of the 1,550 feet level particularly so. The ore breasts at the north portion of the 1,400-feet level show improvement, and are yielding unusually well. The main drift, at the 1,550-feet level, is being enlarged and re-timbered, consequently no ore is hoisted through the Gould and Curry shaft at present, but all the ore is hoisted through the Consolidated shaft. Work at the 1,700-feet level will not be resumed until the re-timbering of the double winze above that level is completed. The C. and C. shaft is now down 125 feet below the 1,500-feet level, and has all the water the pumps can manage, rendering sinking progress rather slow—about two feet per day. Rock hard, but blasting well.

Imperial Consolidated.—Ore extraction going ahead as usual at the 2,000-feet level, and everything running all right again throughout the mine. The water is drained from the shaft and work going ahead as before in the drift from the south winze; also, in the north drift. The connection made with the Alpha drift at the 2,000-feet level is of great importance giving an excellent and much needed circulation of air, and cooling both mines considerably.

Julia.—Drift east from the shaft, at the 1800-feet level, is in 247 feet. Face in favorable working; vein matter. South drift, at the same level, is in 388 feet face in low grade ore, showing constant improvement and giving good promise of running into a paying ore body. The south drift at the 1,600-feet level, is also showing well and very promising, passing through fine looking vein material, with occasional small bunches and streaks of pretty fair ore. The probabilities of running into a good ore body before coming to its proposed connection with the Ward shaft, are very encouraging.

Ophir.—Daily yield continues to be about 300 tons. The various ore stopes and breasts show no sign of giving out, more particularly at the 1600-feet level, where, in the eastern portion especially, considerable improvement is noticeable. The north drift at the 1200-feet level is also showing finely. The main incline is being pushed

downward to its connection with the upraise from the 1,700-feet level as fast as practicable.

Sierra Nevada—Owing to the great amount of water met with at the 1,700-feet level, sinking the shaft is not yet resumed. Prospecting operations at the upper levels go ahead as usual.

Sutro Tunnel.—Total length from mouth to face of header, Sept. 28th, 14,444 feet. Very fair average progress is being made at present, the face being in favorable working material, composed of hard porphyry, with quartz and clay streaks. A heavy stream of water flows from the tunnel, sufficient to supply several mills in case they were needed. And the chances are that mills will be needed sooner or later, for very excellent ore prospects and assays have been met with at various points thus far already, and the tunnel has penetrated the regular broad Comstock ore belt for over 2,000 feet. A bonanza may be run into by the Sutro Tunnel at any time.—*Gold Hill News*, Sept. 28.

Raymond and Ely.—A recent letter from this mine says: "The drift being run west on the line of the south vein, 10th level, has been extended 29 feet during the week; the face still shows a strong, well-defined fissure, with a small streak of favorable vein matter, but the balance of the filling between the wall of the fissure does not look very promising. We were compelled to suspend operations in the west winze, which was being carried down from the 10th level, as we cut a stream of water in the bottom which cannot be removed with the appliances we had at our command; consequently, the connection will have to be made by raising from below, but the west drift on the 11th level will have to be extended about 200 feet farther before it will reach the point where the winze is coming down. The west drift on the 11th level has been extended 16 feet during the past week, making its total length 1,632 feet. The face still shows the fissure regular and well defined, but the filling between the walls show no indications of ore; still there appears to be more quartzite making in the face as the drift progresses westward. All the prospecting which was being done in the old abandoned levels of the mine by the Company has been discontinued, as our explorations in that locality disclosed but little ore of practical value. We are getting ready to start up the 30-stamp mill for the purpose of running through what ore we have on hand, and will run a portion of the mill on tailings and see what results can be obtained."—*Pioche Record* Sept. 24.

The Hukill Silver Mine, is situated about a mile and a half west of Idaho Springs, and crosses the valley of Clear Creek near the Whale Mill. Crossing the mountain at right angles, the mine can be worked for years by the four levels already started on the vein, without recourse to deep shafts and hoisting machinery; when these are required, Clear Creek can then furnish power enough to sink 1,000 feet deeper, before an engine is needed. In its facilities for cheap transportation of ore, timber, and supplies, the location of the mine is surpassed by none in Colorado. The out-croppings of the vein have been opened and explored by shafts and crosscuts, for a distance of 1,288 linear feet: that four levels —310, 300, 168, and 30 feet respectively—have been run, and 750 feet of shafts and winzes sunk, showing an average width of ore vein of over two feet, and an extensive bonanza five feet wide of solid mineral; that in this work of developmeat 1,700 tons of ore have been produced at a profit of over $28,000;—and but little stoping has been done. The Hukill ore contains gold, silver, and copper. A concentrating mill, with amalgamating arrangements, will soon be erected near the mine, to treat the large amounts of third and fourth-class mineral which is not rich enough to bear shipment, and has not hitherto been utilized. The work of exploration is still steadily progressing, and is proving that depth only adds value and extent to the mineral vein.—*Georgetown Miner.*

Meadow Valley.—It is thought that operations on this mine will be resumed by the 1st of January. The pumping engine is nearly all together on the floor, and is receiving the finishing touches; the hoisting gear for the pump shaft is all finished, and it, with the remaining parts, will be shipped immediately. This engine is one of the most perfect pieces of pumping machinery ever built on the coast, or in fact, anywhere else. It is more powerful than the engine just started on the Hale & Norcross and Savage Mines in Virginia City.

Boston Hydraulic Gold Mining Company.—This company announces a quarterly dividend of $2 per share, equal to $2,400.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Oct. 5, 1876.

The silver stocks have again been the feature of the week, and have made some very heavy strides up to yesterday, when they seemed to culminate for the time being at least. Duncan sold up from 9⅞ September 29 to 14¼ Oct. 3, at which price considerable stock came out forcing the price down until it reached 11 this P. M. International sold as high as 2 but large blocks being offered at that the price has receded to 1¾ this P. M. Calumet has sold at 170, but 168 is the bid to-night. Copper Falls is steady at 4¾, the sales all being at 5. Dawson Silver has had some life put in it, and sold all the way from 40 to 50, closing offered at 45. Franklin is a little weaker at 14 best bid. National is in demand at $2 this afternoon. Petherick has sold from 50 to 62½, and closes at 60. Pewabic is a little heavier at 5 asked. Altogether the market closes a little heavier to-night.

The National Mining Company held its annual meeting yesterday, October 4. The old board of directors, with one exception, were elected. WILSON W. FAY, J. G. MARTIN, and G. PAGE were elected an auditing committee to examine the Treasurer's accounts. The Treasurer's account showed a balance of $4 per share for the stock in clean assets.

Humboldt Mining Company.—An assessment of 15 cents per share has been levied on the capital stock of this company, payable October 16, 1876, by stockholders of record October 5, 1876.

Sales for the week have been as follows:

		Per share.
Calumet & Hecla Copper Mining Company.....	53	Share at from $169 to $170
Osceola Copper Min. Co.	200	" 20
Quincy " "	100	" 46½
Coper Falls " "	125	" 5
Franklin " "	25	" 15½
National " "	450	" at from 1⅞ to 2
Petherick " "	500	" " 50c. to 60c.
Duncan Silver Min. Co.	7,991	" " 9⅞ to 14¼
Int'n'l. " "	7,750	" " 1¾ to 1 31-32
Dawson " "	1,250	" " 45c. to 50c.
Total sales	18,444	shares.

Later.—As we are now writing Duncan Silver is selling at $11, International at 1⅝.

QUOTATIONS:

DESCRIPTION.	Par Value.	No. of Shares.	CLOSING. Bid.	Asked.
Copper Stocks.				
Allouez	$50	20 000	$10 00	$13 00
Calumet and Hecla	25	80,000	168 25	168 75
Central	25	20,000	32 00	34 00
Copper Falls	50	20,000	4 75	5 00
Dana	25	20,000	17	22
Franklin	25	20,000	14 25	14 75
Humboldt	25	20,000	7	10
Madison	25	20,000	30	37½
Mesnard	25	20,000	45	50
Minnesota	25	20,000	1 75	2 00
National	15	20,000	2 00	2 25
Osceola	25	40,000	20 00	21 00
Petherick	25	20,000	60	62
Pewabic	25	20,000	4 50	5 00
Phenix	25	20,000	12 50	13 00
Quincy	25	20,000	46 50	47 00
Ridge	25	20,000	5 50	6 00
Rockland	25	20,000	37	45
Star	25	20,000	37	50
Superior	25	20,000	12½	17
Silver Stocks.				
Duncan Silver	20	60,000	11 00	11 25
Dawson Silver			40	45
International Silver	20	60,000	1 62½	1 68¾

Gas Stocks.

NEW YORK, FRIDAY EVENING, Oct. 9, 1876.

WE learn that the Brooklyn gas companies are getting back some of the oil consumers. This has imparted a little better feeling in the quotations of these companies, and we accordingly advance some of the prices. With the exception of Manhattan, N. Y., stocks continue dull and inactive.

The Consumers' Gas Light and Coke Company, of Chicago, have submitted a new ordinance to the Council, offering to supply citizens with gas at $2.25 per 1,000 feet. This is a company, recently organized to manufacture gas under a new process.

Boston Gas Company.—This company paid the semi-

MINING STOCKS.

AMERICAN MINING BOARD'S LIST.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	*No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment.	Total Dividends paid.	Date and Amount of Last Dividend.	CLOSING QUOTATIONS ‖ American Currency. Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	TOTAL SALES FOR THE WEEK.
Alpha Cons. *g. s.*	Nevada.	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75, $1.	....	.....	....	$52 00	$51 00	....	....	$57 00	300
Belcher, *g. s.*	Nevada.	1,040	10,400,000	104,000	660,400	April 14, '71, $1.	$15,397,200	April 10, '76, $1.	....	....	....	$24 62½	$23 50	23 00	400
Best and Belcher, *g. s.*	Nevada.	545	10,080,000	100,800	136,192	July 13, '74, 50c.	....	.....	....	....	....	48 00	53 00	52 00	150
Bullion, *g. s.*	Nevada	943½	13,000,000	100,000	1,802,000	Aug. 6, '72, $1.50.	....	.....	....	....	....	....	....	....	.....
Caledonia, *g. s.*	Nevada.	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.00.	....	.....	....		....	9 00	11 25	11 25	300
California, *g. s.*	Nevada.	600	54,000,000	540,000	....	.....	5,400,000	Sept. 15, '76, $2.	....	67 00	....	67 00	68 50	68 25	625
Chollar Potosi, *g. s.*	Nevada.	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	....	....	....	....	91 00	88 00	150
Cleveland, *g.*	Colo.	3,715	250,000	25,000†	....	.....	....	.....	....	....	6 37½	6 62½	6 87½	7 00	2,200
Cons. Imperial, *g. s.*	Nevada.	468	50,000,000	500,000	125,000	July 25, '76, 25c.	....	.....	....	....	4 87½	4 75	....	4 75	400
Cons Virginia, *g. s.*	Nevada.	7100	54,000,000	540,000	411,200	June 11, '73, $3.	22,680,000	Sept. 11, '76, $2.		62 50	61 50	61 75	61 00	62 00	1,260
Confidence, *g. s.*	Nevada.	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.13½	....	....	....	....	18 75	18 00§	150
Crown Point, *g. s.*	Nevada.	600	10,000,000	100,000	1,073,370	Aug. 15, '76, $1.	11,588,000	Jan. 12, '75, $2.	....	....	....	12 00	13 25	12 00	500
Eureka Cons. *g. s. l.*	Nevada.	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75. $1.	....	....	....	....	....	....	.....
Exchequer, *g. s.*	Nevada.	400	10,000,000	100,000	180,000	Feb. 9, '74, $1.	....	.....	....	....	....	....	....	17 00	200
Gould and Curry, *g. s.*	Nevada.	621	10,800,000	108,000	2,018,000	Aug. 11, '76, $1.	3,826,200	Oct. 10, '70, $10.	....	....	16 00	15 00	....	16 50	450
Grant	Nevada.	1,000	10,000,000	100,000	....	.....	....	.....	....	3 00	2 87½	3 00	3 00	3 37½	7,000
Hale & Norcross, *g. s.*	Nevada.	400	11,200,000	112,000	2,130,000	Aug. 8, '76, $1.	1,598,000	April 10, '71, $5.	....	....	11 00	13 00 §	21 75	14 00§	200
Hukill, *s.*	Colo.	3,283	1,000,000	10,000	....	.....	10,000	$1	....	....	....	....	....	....	.....
Indian Queen, *s.*	Nevada.	1,000	3,000,000	60,000	....	.....	60,000	.....	....	....	....	....	....	....	.....
Julia. *g. s.*	Nevada.	3,000	11,020,00	110,020	110,000	Sept. 11, '76, $1.	....	.....	....	....	....	....	....	7 50	.....
Justice. *g. s*	Nevada.	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	....	21 50	20 75	18 50	18 50	18 50	800
Kentuck, *g. s.*	Nevada.	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	....	....	....	12 00	....	....	.....
Kossuth, *g. s.*	Nevada.	2,700	5,400,000	108,000‡	405,000	Aug. 15, '76, 50c.	....	.....	....	....	....	....	....	....	.....
Leopard	Nevada.	1,500	5,000,000	50,000	50,000	March 31, '76, $1.	87,500	Feb. 25, '76, 75c.	....	....	10 00	10 00	....	....	.....
Mexican, *g. s.*	Nevada.	600	10,080,000	100,800	100,800	Sept. 5, '76, 50c.	....	.....	....	....	32 00	....	31 75	29 50	250
Merrimac, *s*	Mass.	5,000	500,000	5,000	....	.....	....	.....	....	40 00§	....	....	41 00	40 50	450
Morning Star	Nevada.	1,600	8,000,000	80,000	....	.....	....	.....	....	....	....	....	....	....	.....
Northern Belle, *s.*	Nevada.	1,600	5,000,000	50,000	....	.....	800,000	Sept. 15, '76, $1.	....	23 00	....	24 00	24 25	25 00	100
Ophir, *g. s.*	Nevada.	675	10,080,000	100,800	2,034,400	May 14, '75, $1.	1,394,400	March 9, '64, $4.	....	....	....	....	58 50	....	200
Overman, *g. s.*	Nevada.	1,200	3,840,000	38,400	2,107,080	June 26, '76, $3.	....	.....	....	....	....	85 00	83 00	84 50	400
Pleasant View	Colo.	1,200	200,000	20,000	....	.....	....	.....	....	....	2 87½	2 87½	3 25	3 75	1,700
Raymond and Ely, *g. s.*	Nevada.	5,000	3,000,000	30,000	510,000	Nov. 5, '75, $3.	3,075,000	Sept. 10, '73, $3.	....	....	....	....	....	....	.....
Santiago	Nevada.	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	....	.....
Savage, *g. s.*	Nevada.	800	11,200,000	112,000	2,746,000	May 31, '76, $2.	4,460,000	June 11, '69, $3.	....	....	....	....	18 75	....	400
Seg. Belcher, *g. s.*	Nevada.	160	640,00	6,400	214,800	April 11, '76, $5.	....	.....	....	....	....	....	....	....	.....
Sierra Nevada, *g. s.*	Nevada.	3,650	10,000,000	100,000	1,400,000	Aug. 22, '76, $1.	102,500	Jan. 16, '71, $1.	....	14 50	15 50§	....	13 00	13 50§	200
Silver City	Nevada.	3,900	6,310,000	63,100	....	.....	....	.....	....	....	....	....	....	....	.....
Silver Hill, *g. s.*	Nevada.	5,430	10,800,000	108,000	756,000	July 18, '76, $1.	....	.....	....	....	....	9 00	....	....	.....
South Comstock, *g. s.*	Nevada.	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....	....	....	....	....	....	.....
South. California, *g. s.*	Nevada.	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Trenton	Nevada.	..	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Union Cons. *g. s.*	Nevada.	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	....	....	....	....	....	....	.....
West Belcher	Nevada.	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Yellow Jacket. *g. s.*	Nevada.	1,200	12,000,000	120,000	2,598,000	July 18, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	....	27 00	28 00	27 50	28 00	29 00§	1,450
Young America, *s.*	Nevada.	1,000	3,000,000	30,000	....	.....	....	.....	....	....	....	....	....	....	.....

Total sales shares.....20,035

g. Gold. *s.* Silver. *l.* Lead. * The par value of shares is $100, unless otherwise designated. † The par value of these shares are $10 each. ‡ The par value of these shares are $50 each.
‖ Closing quotations represent the latest prices bid. Prices asked will have a § affixed.

annual interest on its 6 per cent. bonds, issue of 1880, equal to $15,000, on the 2d inst.

Montreal Gas Company.—We note recent sales of 129 shares of this stock at from 157¼ to 158½.

Northern Liberties Gas Company.—We note a recent auction sale in Philadelphia of six shares of this stock at $65 per share.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Dividend.	When Paid:	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Jan. '76	108	110**
" " Bonds	90,000	1,000	†3½	Feb. '76	106	110
NewYork, "	4,000,000		5	Jan. '76	135	141
Metropol. "	2,500,000	100	5	Mar. '76	145	148
" " Certf.	1,000,000	....	3½	" "	102	104½
" " Bonds	500,000	1,000	3½	Jan. "	102	102½
Harlem "	1,850,000	50	4	Feb. '76	95	103
Manhattan "	4,000,000	50	10	July "	240	250
Brooklyn, B'klyn	2,000,000	25	5	June '76	180	188
Nassau "	1,000,000	25	4	Jan. '76	75	80
" " Certf.	700,000	1,000	3½	Nov. '76	95	98
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	Jan. '76	85	90
" " Bds	325,000	....	3½	Feb. "		95
Metropol. "	1,000,000	10	3½	Nov. '75	73	74
Wmsburgh "	1,000,000	50	5	Jan. '76	130	135
" " Certi.	1,000,000	....	3½	Jan. "	101	102½
Citizen's "	1,200,000	20	2½	Jan. '76	92½	93
" " Certf.	320,000	1,000	3½	April "	100	102
J. C. N.J.	386,000	20	5	July, '75	160	—
Centl. Westch. N.Y.	466,000	50	4	July, "	95	—
Subur'n " "	350,000	50				95

† Gold.

Companies out of Town.*	Cap. Stk.	Par	Bid	Askd
People's " " of J. C.			120	133
¶Citizen's G. L. Co., New'k. N.J.	1,095,000	50	95	97
Perth Amboy G. L. Co., N. J.		25		92
Hempstead " " L. I., N.Y.	40,000	100		100
Jamaica, " " " "	25,000	100		100
Richmond Co., S. I. "	300,000	50	97	100
Citizens', Rochester, "		100	45	50
Rochester Gas Co., "		100	50	
‖People's G. L. Co. Albany,"	1,000,000	100		20
§Mutual " Buffalo "	750,000	100	50	60
Mutual " Detroit Mich.		50	18	
TroyG. L. Co., Troy, N. Y.			108	
Citizens " " "	600,000	100		100
Brockport, N. Y., G. L. Co.	25,000	100	60	80
Saugerties G. L. Co.	15,000	100	100	105
†Baltimore G. L. Co., Balt., Md	2,000,000	100	163	175
St. Louis G. L. Co., St. Louis, Mo	600,000	50		100
People's G. L. Co., Balt., Md	2,000,000	25	24	24½
Hannibal G. L. Co., Hanni., Mo.	100,000	100	95	100
La Clede, St. Louis, Mo	1,200,000	100		102
Lewiston G. L. Co., Lewis., Me	400,000	100	55	70
Chicago G. L. Co., Chicago, Ill.	2,000,000	100	125⅞	
Jacksonville, Ill.	120,000	100	82	
‡Lima, Ohio.	60,000	100	10	
Derby G. L. Co., Derby, Conn.	160,000	100	60	80
Woonskt G. L. Co. Woonskt, R.I.	150,000	100	100	
Fort Wayne G. L. Co. F. W., Ind		100	90	100
North. LibertiesG. L. Co. Phila.		25	29	
Wilkes-Barre G. L. Co W. B. Pa.		50	70	
Washington G. L. Co., Phila.			42	43
Pottsville, Pa. Gas Co		50	40½	
Portland G. L. Co. Portland, Me	350,000	50	72	75
Hartford G. L. Co., Hartford, Ct	700,000	25	41	
Boston G. L. Co., Boston, Mass.	2,500,000	500	790	800
East Boston, Mass		25	30	33
Chelsea G. L. Co. Chelsea, "	300,000		139	
Cambridge G. L. Co., Cam., "	700,000		132¾	
Louisville G. L. Co., Louis., Ky.			131	133
Cincinnati G. L. Co, Cincin, O.				200
Carondelet G. L. Co., Mo		50		15
S. F. G. L. Co. San Francisco, Cal	10,000,000	100	104½	
Stillwater G. L. Co., Minn.	50,000	50		26
City G. L. Co. Montreal, Can.	1,440,000	40	167	169
Consumers G. L (old.) Tor., Ont	600,000	50	134	
Hamilton G. L. Co., Ont.	150,000	40	112½	
Halifax G. L. Co., Halifax, N.S.	400,000	40		147½

* These quotations represent the latest obtainable prices at which sales were made.

† This Company has issued $1.000,000 in certificates in addition to their stock indebtedness, on which they pay interest at the rate of 6 per cent. gold.

‡ This Company has $30.000 in bonds outstanding.

§ $200,000 represents the bonded indebtedness of this Company.

‖ $350,000 of the indebtedness of this company is represented by bonds.

¶ $124,000 of the indebtedness of this company is represented by bonds; also $53,000 in certificates, which is included in the aggregate stock debt quoted.

** Ex-dividend.

W. B. SCOTT & CO.,

Bankers and Dealers in Gas Stocks

24 PINE STREET, NEW YORK.

Special attention given to the Stocks of Companies located out of Town.

FIRE BRICK.

B. KREISCHER AND SON.

58 Goerck street,

Corner Delancey street, East River. NEW YORK.

Blocks, Slabs, and Clay Retorts,

Branch Works at Kreischerville, Staten Island,

ESTABLISHED 1845.

Perfect Combustion by an Oxygen Blast.

By this process, oxygen is imparted to the blast on BLAST FURNACES, CUPOLAS, FORGES, BOILERS, etc., simply by its passage, on its way to the place of combustion, through a chamber or vessel, holding an oxygen compound, from which, by the agitation of the air thereon, oxygen is set free and carried off with the blast. The perfection in the combustion becomes apparent from the great increase in, and concentrated state of the heat—absence of smoke and all gases, mainly of sulphurous and carbonic oxide—total conversion of all carbon in the fuel into heat, and consequent saving in fuel. The advantages from the Oxygen Blast, besides this latter, are various, such as: ON FORGE FIRES, a gain in time and perfection in welding. ON FIRES UNDER BOILERS, where the saving in fuel is from 25 per cent upwards, an increase in capacity of generating steam in the same ratio. ON CUPOLAS, an improvement in the quality of the castings, which become very tough and uniformly soft to work, the iron, while in a fused state, is purified from sulphur, carbon, etc., and, consequently, softened and strengthened.

FOR BLAST FURNACES this process is destined to overcome the shortcomings of the present system, which are all traceable to imperfection of combustion from deficiency in oxygen in the blast, and to the applied modes of furnishing this as contained in the atmosphere, together with nitrogen, necessitating the introduction of this latter in large volumes. With nothing but heat and fixed carbonic acid gas as products of combustion, and a much lessened introduction of nitrogen, conditions are created, which will not fail to bring about a radical change for the better, as regards cheapening and perfecting the product.

The work attributed to PUDDLING FURNACES and BESSEMER CONVERTERS, and that of decarbonizing the iron for wrought iron and steel purposes generally, is much shortened, simplified, cheapened and perfected, as to purity of product obtained, through the agency of the chemical oxygen in the blast.

FOR DESULPHURIZING SILVER AND OTHER ORES, the process offers the readiest and cheapest means. The process is simple and easily applied, with the only and small expense for the chamber holding the oxygen compound. The cost of the oxygen is small compared to the gain from its use, and is made subject to this. Although the process has been in use for a year, the inventor felt reluctant to offer it to the public before having demonstrated its utility and practicability, and fully established this, not from a theoretical standpoint, but from the testimony of manufacturers whose standing is of the highest order, and such as to entitle it to the consideration of others. For further particulars address CHAS. HORNBOSTEL,

56 Broadway (Room 2f), N. Y.

Having used the oxygenated blast, the invention of Mr. HORNBOSTEL, for over a year, we can give it our full endorsement as a matter of merit. The oxygen in the blast operates towards increasing and purifying the heat to such an extent as to make it of more and better service, and becomes a fuel and time-saving medium.

HERRING & CO., SAFE MANUFACTURERS,
251 & 253 Broadway, N. Y.

NEW YORK, July 28th, 1876.

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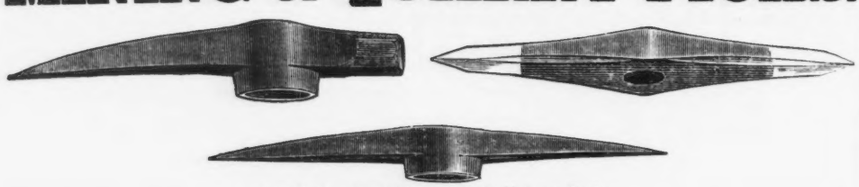

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